Audia-Visual Materials

Exploration Series in Education

Under the Advisory Editorship of John Guy Fowlkes

AUDIO-VISUAL

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SECOND EDITION

HARPER & BROTHERS, PUBLISHERS, NEW YORK

MATERIALS

THEIR NATURE AND USE

AUDIO-VISUAL MATERIALS, *Second Edition*

Printed in the United States of America

C-H
Library of Congress catalog card number: 57-7637

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AND SPENDING

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Editor's Introduction

DURING the eight-year period, 1946–1954, the use of filmstrips, sound films, and disk recordings increased by approximately 300 percent. Paralleling the marked growth in the use of audio-visual materials is a corresponding increase in the number of specialists in audio materials on the staffs of educational institutions. These and other similar data are telling evidence of the fact that audio-visual materials are today recognized and accepted as essential means of increasing the effectiveness of teaching and learning.

Although it might appear that the above statements reveal a distinctly new movement in the educational program, this is not the case. The printing press itself is the oldest and still most widely used device in the wide array of audio-visual materials. Chalkboards, display boards, globes, maps, models, mock-ups, slides, films, filmstrips, projectors, radios, television, recordings, kinescopes, and telefilms are powerful testimony of human ingenuity to provide ways and means of making learning and teaching richer, more concrete, and more meaningful.

Regardless of the number and nature of mechanical devices for facilitating effective learning and teaching, the major ways in which human beings learn still seem to be seeing and hearing, looking and listening. It must eternally be realized by all those responsible for education that the basic function of audio-visual materials is to enable learners to see and hear, look and listen more fully and discriminatingly and with greater comprehension.

It is assumed in this new edition that all audio-visual materials are ways and means of realizing the objectives or goals of an educational program. These materials are not ends in themselves but rather tools for learning and teaching. Since they are tools, they must be utilized in terms of the patterns of given instructional programs.

Audio-visual materials will be chosen wisely and used effectively only if teachers are intimately familiar with their individual unique advantages and the correct methods of using them. It is therefore clear that classroom teachers, along with supervisory and administrative officers in local school systems, must "know" audio-visual materials and "know" how to choose and use them.

This volume is a scholarly but down-to-earth and usable treatment of audio-visual materials—their nature and use. It is illuminating and intriguing. It emerges from the daily experiences of learners and teachers. A host of classroom teachers, school administrators, and producers of audio-visual materials have contributed to it.

The unique qualifications of the authors are strikingly demonstrated in this treatise on the why, the what, and the how of audio-visual materials. Experienced and prospective teachers alike will find this book stimulating philosophically and highly practical in their role as companions and guides in the process of learning.

JOHN GUY FOWLKES

University of Wisconsin

Authors' Preface

DURING the fifty years which represent our combined teaching experience, we have taught in the intermediate grades and in the junior high school, have served as supervisors and administrators in public schools, and are now professors of education in two universities. As teachers of courses in audio-visual instruction, we have spent the last four years putting the first edition of *Audio-Visual Materials—Their Nature and Use* to the test of day-to-day teaching, among both teachers in training and teachers in service.

All during this time we have conscientiously sought answers to such questions as: Does the content anticipate the audio-visual needs of teachers in their daily classroom work? Should some areas of content be expanded or less emphasized? What new audio-visual education topics should be added?

Our answers to these questions are evident in this new edition. The role of audio-visual materials in currently debated areas of education has been discussed. For example, in the film chapter, we have added material that describes the role of films in the improvement of reading. It is shown that wisely selected instructional films actually create readiness for reading. This is documented by pertinent excerpts from the researches of Romano, Fitzwater, Witty, Gorman, and others. Similarly the relationship between graphic materials, transcriptions, tapes, etc., and greater accomplishment in language arts, social studies, history, and other areas of the curriculum is described and documented with evidence in other chapters.

The chapter on utilization presents a tested audio-visual approach to the teen-age problem of driver education and safety.

Since the first edition, numerous materials for audio-visual instruction have appeared—e.g., prerecorded tapes for teaching, kinescope recordings of the best in educational television, and telefilms. All of these and

many others are carefully described and suggestions made for using them.

Because teachers are currently asking many questions about the role of color in audio-visual materials, discussions concerning the best use of color have been incorporated in each chapter where such reference is desirable and effective. Accordingly, color plates appear close to the text discussion of color throughout the volume.

From 60,000 to 90,000 new classrooms will be built each year for the next ten years. Hence the problem of providing for the use of audio-visual materials in these new buildings is discussed, and concrete recommendations about construction, costs, and classroom light control are given in the chapter on the administration of the audio-visual program.

An expanded appendix includes up-to-date selected source lists for audio-visual supplies, materials, and equipment.

The nature of the captions for the illustrations has been changed. The captions are now worded so as to complement the text. Frequent question and judgment captions stimulate the participation of the reader and student, and encourage the use of the illustrations in class discussion.

Finally, the organization of the new edition has been planned to fit in readily with the time and pace demands of the typical college and university semester, in both "on" and "off" campus situations.

The revision, like the first edition, continues to explore the philosophy that seeing and hearing, looking and listening *have been* and *will continue to be* the major ways and means by which human beings learn. It provides a basis for and a guide to broader and more efficient opportunities for learning. Applications are described so as to be understandable and valuable to both the teacher in training and the teacher in service. Thus, it is the central purpose of this volume not only to describe the materials of audio-visual instruction but to suggest methods and plans for the most effective utilization of these materials in daily classroom work.

This revision, like the first edition, has been completed with professional assistance from many persons. The authors are deeply indebted to John Guy Fowlkes, formerly dean of the University of Wisconsin School of Education, and now, since his return from India, professor of education, for his continued counseling.

To the many who saw fit to lend competent and generous assistance we wish to express our deep appreciation: Miss Elizabeth Golterman, St.

Louis; Mr. Albert K. Nielson, Madison College, Tennessee; Dr. Floyde Brooker, Washington, D.C.; Mr. Harry A. Johnson, Virginia State College; Mr. Jack A. Hartvigsen, Brigham Young University; Mr. Ralph Dury, Cincinnati Museum; Mrs. Margaret Divizia, Los Angeles; Messrs. Fred Harcleroad, Thomas Clemens, Richard Mitchell, and Harold Hailer of San Jose State College; Miss Martha Gable, Philadelphia; Messrs. Charles Norford, Horace Hartsell, and Wilfred Veenendaal of Michigan State University; Mr. Guy Michener, Des Moines; Mr. Rolland Schlieve, Cape Girardeau; Mr. Lee Campion, St. Louis; Mr. Lee Cochran, State University of Iowa; Mr. W. E. Williams, Sul Ross College; Mr. Robert deKieffer, University of Colorado; Mr. Neville Pearson, University of Minnesota; Mr. Ray Denno, San Diego County Schools; Mr. C. J. Arnold, Mankato, Minnesota; Miss Laura Johnson, Messrs. Frederick White, Richard Williams, and Maurice Iverson—all of the University of Wisconsin; Hamilton Howard, Central College of Education, Ellensburg, Washington; and Herbert Hite, Pullman, Washington.

We wish to acknowledge our deep appreciation to Miss Dorothy Thompson for editorial advice and to Miss Elizabeth Stitgen and Mrs. Ruth Murphy for their very valuable assistance in typing and proofreading.

Since a book about audio-visual materials should rely heavily on pictures, charts, and diagrams, we expressly thank the various individuals and companies who supplied many of the illustrations; an acknowledgment section lists their names. The quoted passages used to amplify our ideas are acknowledged in the footnotes.

WALTER A. WITTICH
CHARLES F. SCHULLER

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Young America Films, Inc.: Figs. 12.8 (bottom), 12.7 (top), 14 12, 15 5 (*bottom left*).
Zenith Radio Corporation: Fig 10 14

If McGuffey were to return today, what a change he would behold! The one-room school, long a symbol of the American frontier and rural independence and laissez-faire planning, has given way to the consolidated rural or large urban school which provides for curriculum activities not even dreamed of in his time.

Today's students would have to be explained to McGuffey. Instead of the select few, mostly young boys, who were able to put off the press of economic necessity that put most children to work as soon as they were physically able, he would see a vastly different school population. He would see almost all the children of all the people in attendance—27,000,000 in the kindergarten through elementary-school level, 9,000,000 at the high-school level.

He would see in these school groups not only the self-motivated, the self-reliant, the highly purposed, but the whole gamut of school-age youth—the bright, the dull, the typically wholesome and enthusiastic younger generation trooping to the best schools any society anywhere has seen fit to provide its youth.

The school curriculum? In a few short decades it has evolved from a narrowly prescribed college preparatory course to reflect the widely diversified, many-tracked, fascinating needs of our youth and to prepare them for their future role as citizens in a society which is becoming each year more bewilderingly complex and varied in its expanding opportunities.

And what of the teacher? At the turn of the century he often had only one year of training after high school before he took his place facing a crowded classroom. Today's teacher has four or five or years beyond high school, and acquires psychological as well as subject skills. The teacher today must be a student of child behavior and motivation, a

Fig. 1.1. In a few short decades the one-room school has become the modern school plant, housing opportunity to know today's best curriculum offering

patient counselor of young people; at the same time he must be competent to handle the ever-increasing demands of a diverse and growing curriculum. In addition, he must be competent in selecting and using the vast variety of learning experiences needed if the child is to understand the world environment.

To be a competent teacher today is to understand more thoroughly

the shifting, changing nature of learning tasks, to understand the methods available in the classroom for providing all manner of needed and meaningful learning experiences, and to understand audio-visual techniques as a means of accomplishing learning goals efficiently.

It is desirable, then, for teachers—both in training and in service—to know about the changes in communication techniques, the shift in the school population, the expanding nature of the curriculum, and, in addition, to have a better understanding of the role of audio-visual materials in schools today.

TRENDS IN THE MEDIA OF COMMUNICATION

In the year 1900 communication was largely by word of mouth. This was before the advent of the radio, during the early development of the motion picture, and before television. Since 1900 communication patterns have changed dramatically in almost all social situations, save in the school; the change in trend since 1920 is indicated in Table 1.1.

TABLE 1.1. EXTRA-SCHOOL TRENDS IN COMMUNICATIONS MEDIA IN THE UNITED STATES

	1920	1930	1910	1950	1955
Total households	24,351,000	29,904,000	34,948,000	43,554,000	46,893,000[a]
Total daily newspapers	2,528	2,427	2,170	2,021	1,984
Total newspaper circulation	31,906,000	44,110,000	39,434,000	52,270,000	45,824,000[b]
Total magazines—weekly, monthly, quarterly, etc.	4,315	5,529	7,124	7,622	8,092[b]
Total radios					
Homes		12,048,000	29,000,000	45,000,000	52,000,000[a]
Automobiles			7,500,000	17,000,000	35,700,000[a]
Total television sets				8,000,000	38,700,000[a]
Motion-picture theaters					
Closed			1949: 19,323[c]	1951: 19,323	1956: 14,613[d]
Drive-in			1949: 983[c]	1951: 3,323	1956: 4,587[d]

[a] All figures from *World Almanac*, 1929–1955.
[b] All figures from *Newspapers and Periodicals*, N. W. Ayers, 1900–1956.
[c] Figures for 1949 and 1951 from *Motion Picture Production Encyclopaedia*, Hollywood, 1952.
[d] *Film Daily Year Book of Motion Pictures*, 1956.

The daily newspaper circulation in the United States in 1900 was little more than 9,000,000.[1] Within ten years this number had trebled. Today

[1] *Mass Communications*, Institute of Communications Research, University of Illinois, 1949.

newspaper circulation is more than 45,000,000. Present-day newspapers with an increasing number of pages per edition roll off the presses in thousands of communities in morning, noon, and evening editions. Large type, white space, and startling headlines bid for reader interest morning, noon, and night—an incessant, day-in-and-day-out, repetitious demand for attention.

To the newspaper we must add the influence of the magazine. At the turn of the century less than 226 magazines were being published; the total circulation was 23,000,000. Within ten years this number had greatly increased, and today over 8000 weekly, monthly, and quarterly magazines appear. Aggregate subscriptions amount to over 200,000,000 —more than one magazine subscription for every man, woman, and child in the United States.[2]

Magazines today are characterized by all manner of attention-attracting devices. Picture magazines attractively supplemented with color intrigue the reader and arrest his interest. The modern magazine with its demanding format is a far different reader medium than the best of our current textbooks, which by comparison often appear drab.

Prior to 1920 there were not enough radios to encourage the United States Bureau of the Census to tabulate them. In 1922, however, the census estimate of 0.6 of a million radio receivers was released. By 1930 over 12 million were in use, and by 1940 radio was so much a part of our day-to-day communication pattern that 7.5 million sets were reported in automobiles alone, not to mention those in homes. Today, over 87 million radio receivers are in use, 52 million in homes, and an astonishing 35 million in automobiles—standard equipment in today's new cars.

Even today, in the face of the apparent competition from television, radio continues to be an ever-present part of our "audio" environment, as great billion-dollar networks vie for the attention of 160,000,000 listeners.

Today the communication techniques of the average American community are being increasingly supplemented through telecasting. Any teacher or parent who has observed the attention-getting and -holding influence of television as it affects the interest of children can easily appreciate its importance as a communication device. Television is not an

[2] *Ibid.*

addition to man's technique in communicating ideas. It is rather a synthesis of all that he has learned about the printed page, the recording of sound, the ability to capture motion in film form, and finally the tremendous impact provided when all these media are welded into one dynamic force. Television is the fusion of many means of communicating information. The child who sits before the televised program of *Disneyland* is held enraptured in the grasp of a many-sided demand for attention—visual and auditory. The same child will put aside even more basic demands for food and rest as he insists on continuing his identification with heroes and heroines, both human and imaginative.

Television was too young in 1940 to be even a statistic. Not so today. In 1950, there were 8 million receivers in homes and "business establishments." By 1955, a phenomenal industry was producing enough receivers to bring television into almost 39 million homes. Tonight the family no longer sits in the glow of the flickering firelight; rather it responds in unison to the images of the television screen as every trick of mass communication developed during the history of man is brought into the living room.

At first television seemed to be no more than pictures of radio performances. Now it uses the full power of visual description, with the added support of environmental sounds, descriptive narration, and music. Just as once the child identified himself with radio heroes, he now cites acquaintance with television "people" representing the nation, the historic West, and outer space. In some school communities there is as much excitement over educational television as there is over bond issues for the new classrooms needed next fall.

Amid these rapidly changing communication styles, the entertainment motion picture, thought to be on the wane in 1950, has surprisingly survived. A fourth of the old-style roofed theaters closed in the five years following 1950, but, phoenix-like, there has appeared a new façade—the outdoor drive-in.

But we cannot discount the traditional entertainment motion picture. Nearly 500 new features are produced each year. The nearly 15,000 indoor motion-picture theaters are very much in business. Marquees flash their brilliant announcements of single, double, and triple features. Snack bars, popcorn machines, and candy vendors encourage attendance and even closer identification of the audience with the "escape"

world of the movie. Yet a recent study of film use in schools in the state of Wisconsin, where educational films are acknowledged to be widely used, reveals that less than one teacher in four uses this medium regularly.

Amid this clamor for the attention of eye and ear which typifies the "pull" of newspaper, magazine, radio, television, and motion picture, the school attempts to carry on its orderly revelation of the world environment. But it is not fully using the communication techniques which commercial agencies are devising to ensnare and hold the attention of individuals—of "learners."

Those who teach, supervise, and administer schools might well ask themselves these questions:

In the current mass-communication techniques, is the voice of the school being lost?

Do today's communication techniques embrace methods which lend themselves to the more efficient presentation of socially worth-while information that is within the domain of the school curriculum?

It is time that the school attempt to rescue itself from the possibility of losing its voice in the welter of mass-communication techniques. It is time that the school attempt to ascertain whether or not there are *some* mass-communication techniques typical of today—radio, television, press, the magazine—which in part at least may be effectively applied to the day-to-day work of the school.

Unless the school can communicate in an interesting, profitable way with its learners, there is little chance that many educational goals will be accomplished.

THE CHANGING SCHOOL POPULATION

The learner of the 1900-1910 era of necessity became accustomed to understanding what he could of his environment through verbalistic materials. Let us describe him and then contrast him with the child who lives in today's complicated world of communication techniques.

The child of 1900, in a typical situation, completed an elementary-school course which stressed his ability to read, to spell, to write, and to do simple arithmetic. This emphasis on reading, spelling, and writing demanded a high level of attention to detail and to mechanical perfection.

When this child left the elementary school, he usually could read well, largely because of the emphasis his school placed on the printed word. From constant use of the textbooks of that day he learned about his environment via the printed word. Following grade school he more often than not went directly to work; if he was one case out of twelve he went to high school to prepare himself for college.

Because he was one in twelve, he was probably endowed with a high degree of intellectual curiosity. He became well trained by the standards of that day, not entirely because of the techniques of that time but because *he represented a highly selected portion of the potential school-going age group.* He was well above the 90th percentile in ability and intellectual curiosity. He was willing to undergo the tedium of *memoriter* learning techniques. He was willing to pore for long hours over the textbooks of the period, which were often characterized by poor authorship, unattractive format, and questionable accuracy of information, particularly in geography and science.

Today, 25 out of every 27 children of elementary-school age are enrolled in the elementary schools of America. At the high-school level 87 percent of this age group is enrolled in high school. Total enrollment figures from 1900 to 1955 are shown in Table 1.2. No longer can we say

TABLE 1.2. TOTAL SCHOOL ENROLLMENT IN THE U.S.[3]

	1900	1910	1920	1930	1940	1950	1955
Children of elementary age 5–13	15,383,000	17,019,000	19,992,000	22,230,000	20,024,000	22,431,000	27,118,000
Children enrolled in public elementary schools	16,224,000*	18,457,000*	20,864,000*	23,588,000*	21,014,000*	20,714,000	25,118,000
Children of high-school age, 14–17	6,019,000	7,220,000	7,736,000	9,341,000	9,781,000	8,351,000	8,936,000
Children enrolled in public high schools	519,000	519,000	2,200,000	4,399,000	6,601,000	6,953,000	7,784,000
Percentage of high-school age group enrolled in high school	8%	13%	28%	47%	69%	83.3%	87.1%

* Higher enrollment figure due to overage children.

of all these children that they represent a segment of the possible school population that is highly "skewed to the right of the normal curve." No longer can we expect from them the degree of interest, intellectual curiosity, or mental discipline inherent in the 1900 school enrollees. This

[3] 1900–1940 figures from *Biennial Survey of Education in the United States, 1944–1946*, U.S. Office of Education, 1950 and 1955 figures from *Statistical Abstract of the United States*, Bureau of the Census, 1955.

situation poses a fundamental problem in instructional techniques. How can the responsibility of the schools of today be met more effectively? How can increasing areas of socially important information concerning an ever-widening world environment be made known and understandable *to all the children who are in school?*

Many of today's schools continue to be "reading" schools. This often represents an unfortunate situation, not because learning from printed words is bad but rather because the readiness experience necessary to understand the words has not been provided. In order that reading experience may be most successful, a broad background of readiness experience must precede the study, perusal, and interpretation of the printed word. The problem of providing the background experiences necessary to achieve real understanding increases as the things we study pertain to areas remote in time or place.

In too many instances the school of today is operating too nearly in the pattern typified by the 1900 school. It is a reading school, a verbal school, a school which is carrying over too many of the ineffective techniques of the nineteenth century and which in today's communication world can no longer be condoned.

In contrast to the 1900 school child, let us consider today's child. The school child of today lives in a communication world which emphasizes objectivity, visual presentation, and graphic portrayal. Within the brief space of thirty to fifty years, communication emerged from verbal, reading, or word-of-mouth forms into a world that is characterized by an environment of sharp visualization which *demands* the attention of the individual. In today's communication world there are scores of voices which are heeded much more successfully than the voice of the school.

The fact that the school program has not always anticipated or met the needs of the changing school population is reflected in the number of pupils who fail to complete high school. The figures on those who leave school—the drop-outs—are in contrast to the opinion generally held about the effectiveness of our schools. For the nation as a whole, the percentage of pupils entering the ninth grade in 1941–1942 and graduating in 1945 was 46.7; the percentage entering the ninth grade in 1947–1948 and graduating in 1951 was 62.5.[4]

In short, only 6 or 7 out of every 10 children who enter high school

[4] *High School Retention*, Circular No. 398, U.S. Office of Education, 1954.

this fall will graduate four years from now. While this situation is improving, it is still a matter for concern.

It is during the last years of high school, when the individual student gains further maturity in initiative, judgment, and decision making, that most students drop out of school. That this is the case is revealed in Fig. 1.2.[5] The actual reasons for high-school drop-outs are partially

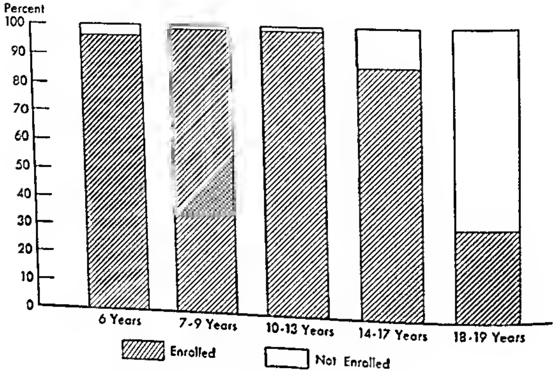

Fig. 1.2. Percentage of school-age population enrolled in school, by age, 1954.

revealed in a study entitled *Early School Leavers.*[6] In it appears the following tabulation entitled "Reasons Given by 957 High-School-Age Youth as to First Importance in Their Decision to Leave School."

1. *Reasons Relating to School*

Preferred work to school	36%
Not interested in school	11%
Couldn't learn, was discouraged	7%
Was failing, didn't want to repeat	6%
Disliked a certain teacher	5%
Disliked a certain subject	3%
Could learn more out of school than in	1%

[5] Source: *Statistical Abstract of the United States*, Bureau of the Census, 1955.
[6] National Child Labor Committee, *Early School Leavers*, Dillon, New York, 1949.

2. *Financial Reasons* (clothes, spending money) 21%
3. *Personal Reasons* (health, parents, friends) 10%

In approximately two-thirds of these withdrawals from school, disinterest of one sort or another in school was the reason. Such headings as "Disliked a certain teacher," "Disliked a certain subject," "Not interested in school" give evidence of this.

The heading, "Preferred work to school," is a simple statement to the effect that of the two alternatives, school or work, work seemed more attractive. The heading, "Couldn't learn, was discouraged," is another way of saying that in many cases the teaching methods employed by the school were not adequate.

One can only surmise the extent to which communication failures were responsible for the attitudes which allowed these youths to withdraw from school. Certainly, these young people found all around them more attractive opportunities than they found in school.

Does not all this point again to the strong possibility that the techniques by which we are communicating information, ideas, and skills to learners need careful examination? There is reason to believe that the instructional methods we are employing today approximate too closely the traditional verbalistic techniques typical of the 1900 school and not those which will stand up in competition with the communication techniques that exist all about us in the extra-school world.

As we examine the instructional tasks which confront the teacher, let us ask whether, among the many modern techniques for communicating ideas which man has developed, we can find more interesting and effective ways of presenting socially important information about today's world to today's school children.

Kinescopes, sound motion pictures, charts, bulletin boards, maps, globes, slides, and filmstrips can be effective avenues to learning. These can be used to help create more effective learning situations. Knowing the school's instructional responsibilities, let us examine the communication world which lies outside the school and from it adapt to the use of the schools the techniques that can help make school work more effective.

Many current communication techniques can be effectively used in implementing the curriculum of the school. Many such techniques will

be useful, not to replace tried and tested teaching materials and methods but rather to supplement them effectively. It is the purpose of this book to show how this may be done.

CHANGING CURRICULA—NEW TOOLS OF TEACHING AND LEARNING

The curriculum of the school must reflect the society it prepares youth to enter. The school's primary responsibility, to communicate understandings of contemporary society to youth, is becoming more and more difficult.

Progress in almost all fields of human endeavor is tremendous. In 1900 no more than 300 job classifications were listed by the federal census. Today the number is 3000. The scientific inventions since 1900 are more fundamental and móre numerous than all those made in the history of man before that date.

The rise of industrialization and its accompanying need for raw materials brought from every corner of the world have opened up trade relationships with peoples unknown to the average citizen fifty years ago and still unknown to many of us today.

The fields of art, literature, and handcraft have revealed the artistic and creative work of people living in the heights of the Andes, the flats of the muddy Congo, and the steaming rain forests of the Malay Peninsula.

All through this, the usual curriculum sequence in social studies, science, and language arts has "slogged along," perpetually behind in the race to keep abreast not only of past accumulations of information but, more important, of current developments everywhere over the face of the globe.

At the onset of World War II the usual elementary social studies text was concerned with peoples of European backgrounds. This very logically grew out of the analysis of a 1900 society which revealed that most of the people in it were descendants of those who came from Europe, England, and the Mediterranean areas. World War II illustrated graphically how current factors can invalidate static values. The same students who during school methodically and laboriously read about people who came from the "type" countries of Europe read news items in the evening paper or news magazine about people and places never mentioned in their formal school work.

Following World War II the Korean conflict brought into prominence peoples heretofore practically unnoticed. The Russian domination of China virtually halted even the little attention that the people, places, and culture of that vast area were just beginning to receive. But the trade agreements, foreign aid plans, and programs for extending technical assistance to underdeveloped areas that are now being negotiated are again making little-known peoples increasingly important to us.

As these new areas of the world become politically and socially important, it is the school's responsibility to give its pupils an understanding of these people and places. Social studies can no longer be confined to Europe; they must now include the islands of the Pacific, the Malay Peninsula, and the millions of people who live in India. As the teacher adds these new areas of subject matter, he will find that audio-visual materials have a great contribution to make.

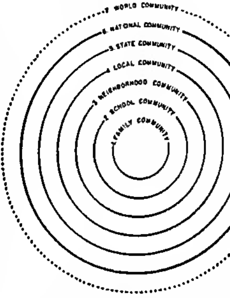

Fig. 1.3. The traditional curriculum emphasis on family, school, and neighborhood communities and on local, state, and national communities and European backgrounds must now be extended to include the ultimate last circle of curriculum responsibility—the *world community*. What kinds of new learning experiences and devices will insure that learners really understand and are prepared to take their places as Americans living in the world today?

In the area of general science, nature study, chemistry, and physics, old text materials are being hastily rewritten. The textbooks of ten years ago did not mention jet or turbojet propulsion. The text of the 1940's said nothing about heavy water, atomic fission, or the relationship between the cosmic energy of the sun and the current discoveries in atomic energy.

Should the old be deleted? No! To it the new must be added.

Many of us are still using maps of the South Pacific which present that region as a vast uncharted stretch of blue water. Look at your own maps when you get back to the classroom. We know that in this vast uncharted mass of blue the major battles of World War II were fought.

Look to the north as we analyze current news items in the magazines

and newspapers concerning the strategies of a forthcoming possible conflict. In the current news magazines we see references to polar distances and polar routes. How many of the maps in our classrooms are Mercator projections (oriented along the equator), a map projection which was invented by a sailing-vessel navigator over three hundred years ago when all surface navigation depended on compass direction alone? Unfortunately, this map is still in use in many of our schools today, even though other orientations with focal points over the North Pole, over Asia, or over the Atlantic Ocean are now necessary. Many of our traditional points of view, preserved for no other reason than tradition, must now be reanalyzed.

In the case of history, we look in vain in schoolbooks for materials concerning the backgrounds of Genghis Khan, Tibet, Korea. We know little about China's history and current culture. A new and potentially powerful social order is developing in India; but what do we know about the history of that country and the millions of people destined to take a prominent place in the world of tomorrow?

Rather, our study of history has been concerned with the traditional European background. This study includes ancient history, modern European history, English history, and history of the United States.

Should we discard this emphasis? No. But let us ask ourselves what we need to add for the good of young learners who will soon take their places as citizens in the world of tomorrow.

Contemporary achievements and advances in vocational crafts, technological improvements in the techniques of home economics and home management and foods, skills in intramural sports, individual and team games in physical education and recreation, and progress in health, in *safety—no matter what area* of the curriculum we examine, the trend seems to be uniform. There is more and more to know—more and more of social importance, more and more experience which the learner must be given before he can assume full and desirable social participation in the rapidly expanding world of today and tomorrow.

In the last half century the United States has become an industrial country which depends on the nations of the world. It is no longer the self-sufficient community of a century ago. It is no longer the booming laissez-faire industrial community of fifty years ago. Today it finds itself in a position involving world interrelationships to a degree which even

the most liberal-minded frontier thinker at the turn of the century would not have dared anticipate.

In view of this, the curriculum is being expanded in terms of courses and subject content beyond anything that was dreamed of in the past. A half century ago the curriculum was rather rigidly prescribed around twenty-four subject units in the fields of grammar, Latin, mathematics, history, and rhetoric.

The *Biennial Survey of Education in the United States, 1954,* describes the composite courses offered by 24,000 American high schools as including 803 distinct and identifiable courses, ranging from the traditional to such new and useful courses as blueprint reading, pressing, cosmetology, plastics, merchandising and marketing, and a host of others unknown fifty years ago.

If any one person took each subject offered by this "contemporary high school," he would have to live for 114 years. And the high-school curriculum continues to expand, because today there is more and more to learn. Each new technological and scientific discovery opens new vistas to curriculum development.

Obviously, the American school today is finding itself with more and more subject information to teach. Of necessity the child spends more time in school. As a result, the chief instructional material, the textbook, has increased in size in terms of both pages and page size. *Even so, vast areas of our world environment are not currently included in formal education courses.*

This situation leads directly to a searching inquiry on instructional procedures, basic information techniques, the effectiveness of currently used instructional materials, and the role of the teacher with his ever-widening responsibility for ever-increasing numbers of children who are coming to him for instruction. Furthermore, the lay public is voicing a continually mounting demand that the schools train young people more adequately to take their places in a world that is more demanding, more difficult to understand, and requires more from the learner than ever before in history.

In this situation it is suggested that the teacher examine the role of audio-visual materials of instruction in terms of their ability to interest more completely the average school child today, more effectively instruct him in the educational goals that have been chosen for him to attain,

and more lastingly equip him with socially desirable information that may be of use to him as he takes his place in the society of tomorrow.

SUMMARY

The American system of public education is a unique social invention found only in the United States. Inherently characteristic of this system is universality of educational opportunity.

Education in the United States has always reflected the society it serves. Originally, as an outgrowth of a frontier society, emphasis was placed on survival on a frontier. As the public school was carried westward, it accurately reflected the mood of frontier people. The school characterized a laissez-faire society and became a symbol of democracy and an ideal.

The United States is unique among the countries of the world in providing public education to all its people. It is public education that has helped to achieve the high standard of living which this country has. Today the schools are confronted with the grave responsibility of evaluating their effectiveness in interpreting the demands of our contemporary society to the learner.

Educational opportunity for all means bringing all the children of all the people into schools. This has created a situation in which the character of the average school pupil has changed markedly, if we compare the 1955 elementary- and high-school pupil with the 1900 elementary- and high-school pupil. The pupil of today is the product of an entirely different environment than was his counterpart of 1900. Today's pupil represents a wider variety of inherent ability and range of interest than did the 1900 pupil.

The school curriculum today embraces responsibilities which were not even thought of in 1900. Increasing amounts of socially useful information come within the curriculum responsibility of today's school. Areas of the world formerly given no consideration must now be studied because of their contemporary social importance in all fields of human endeavor. The fine arts, the social studies, science, home economics, and industrial and vocational art have seen great advances in accomplishment and techniques that must be given consideration.

A communication revolution has occurred in the last fifty years that is typified by the attention-demanding techniques of radio, press, maga-

zine, television, and theater. The school is in the midst of this revolution and must be realistic in inquiring about its effects on the habits, interests, and motivations of the average child in school today.

The schools of today lag far behind contemporary society in developing techniques for the dissemination of information. They find themselves confronted with vastly increased areas of socially important information to be made known to youth. The schools today have greater numbers of students with widely varied interests and aptitudes.

These three developments will cause every thinking school teacher, supervisor, and administrator to ask himself such fundamental questions as: Am I sure that my educational objectives today are socially important? Am I sure that the procedures I am using to help my pupils become informed in terms of socially acceptable information and objectives embody effective instructional techniques?

One important means by which instruction can be improved is to be found in the field of audio-visual materials and techniques and their relationship to the more effective accomplishment of the goals of the modern school curriculum. It is to this end that this book has been written.

Suggested Activities

1. Compare the format of the modern textbook with that of older specimens you will find in the curriculum library, the school textbook depository, or the school or public library. Take into consideration such aspects as page size, readability of type, presence or absence of pictures, style of writing, etc. Report your findings.
2. Compare course of study topics in current curriculum outlines with course of study topics in such outlines ten, twenty, thirty, and possibly forty years ago. These courses of study will be found in the curriculum laboratory or in the instructional materials files of your local school system. Report your findings.
3. Arrange interviews with civic leaders in your community. Ask such questions as these:
   a. In your opinion, have the schools of this community changed very much since you went to school?
   b. What school experiences were most helpful in preparing for your life in the community?
   c. What subjects did you like best? Why?

d. How did you study history, geography, etc.?
e. What do you like best about today's schools?

4. Conduct an interview with the local school superintendent or high-school principal to discover the following:
   a. To what extent has the number of courses offered during the last twenty years been increased?
   b. How do students twenty years ago compare in intelligence, interest, general attitude, etc., with students today?
   c. To what extent has attendance in this high school changed over the last twenty years?
   d. How many freshmen stay to graduate? Why do students drop out?
   e. How do the percentages of children of school age actually enrolled in local elementary and high schools compare with the national percentages in Table 1.2? What implications does this comparison have?

   What conclusions do you draw from this interview?
5. Interview your fellow students and a sampling of high-school students, and ask such questions as these:
   a. What and how many newspapers do you read regularly?
   b. How much time each day do you spend listening to the radio?
   c. How much time do you spend on television?
   d. How much time do you spend reading magazines?
   e. How many motion pictures do you see per month?

   After you have completed your interviews, what are your conclusions?
6. Make a survey of the radio habits, movie habits, television habits, and magazine and newspaper reading habits of a group of elementary-school children. Interview them and ask the questions in 5a–e above. What are your conclusions?
7. Interview several teachers in elementary school, high school, or college and ask them the following questions:
   a. Do you use maps and charts in classroom work?
   b. Do you use motion pictures to illustrate subject content?
   c. Do you use filmstrips?
   d. Do you use radio programs?
   e. Do you use transcriptions and recordings?
   f. Do you study the resources of the community which relate to your subject?

   After you have completed your interviews, what are your conclusions? Report your findings.
8. Ask the high-school principal to help you locate the names of students who have dropped out of school during the preceding year. Arrange among yourselves to interview these students to discover:
   a. Reasons for leaving school.
   b. Attitude toward school work.

c. Best-liked teachers.
d. Best-liked school activities.
e. Least-liked school activities.
f. Things about school that could be improved.

Following these interviews, prepare a digest of the findings and report to your class. What are the implications of your findings for Questions 7 and 8? Does any relationship exist?

9. Arrange for the viewing of the following films. Provide time for discussion of them.
   a. *School House in the Red*, Sound, Color, 43 min., W. K. Kellogg Foundation.
   b. *Wilson Dam School*, Sound, B&W, 20 min., TVA.
   c. *Children Must Learn*, Sound, B&W, 14 min., NYU.
   d. *And So They Live*, Sound, B&W, 24 min., NYU.
   e. *Better Schools for Rural Wisconsin*, Sound, Color, 29 min., Univ. of Wis., Bur. Aud.-Vis. Instr.
   f. *Problem of Pupil Adjustment*, Part 1, *The Drop-Out;* Part 2, *The Stay-In*, each B&W, 19 min., McGraw-Hill.
   g. *Fight for Better Schools*, Sound, B&W, 22 min., March of Time.
   h. *Secure the Blessings*, Sound, B&W, 30 min., NEA
   i. *Mike Makes His Mark*, Sound, Color, 29 min., NEA.

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2.

How People Learn

THE EDITORS OF *Parade* CALLED TOGETHER THREE STAFF ARTIST-ILLUSTRATORS. They were experts. They made their living by visualizing ideas. The editors reported as follows:

> We asked them to draw an animal described by that very complete authority, the *Encyclopædia Britannica:*
>
> "The body is stout, with arched back; the limbs are short and stout, armed with strong, blunt claws; the ears long; and the tail thick at the base and tapering gradually. The elongated head is set on a short thick neck, and at the extremity of the snout is a disc in which the nostrils open. The mouth is small and tubular, furnished with a long extensile tongue. A large individual measured 6 ft., 8 in. In colour it is pale sandy or yellow, the hair being scanty and allowing the skin to show."[1]
>
> Our artists' rather befuddled efforts are shown [in Fig. 2.1].
>
> Now compare them with the aard-vark pictured [in Fig. 2.2]. It proves that *even the most precise words do not convey an idea as graphically as a single picture.*[2]

Notice how the three artists visualized the phrase "arched back." Observe their graphic interpretations of the "extensile tongue," and of "the hair being scanty and allowing the skin to show."

Obviously the meaning given these words was related to varied individual experiences. None of the men had seen an aard-vark. They had seen other animals, however. To one man the phrase "hair being scanty" recalled his previous acquaintance with elephants. To another this same phrase recalled an encounter with an opossum. Since the meanings varied with the individual's experiential backgrounds, variations in visualizations occurred.

[1] See aard-vark, in *Encyclopædia Britannica,* Senior Volume I, p. 4.
[2] *Printer's Ink,* April 1, 1949

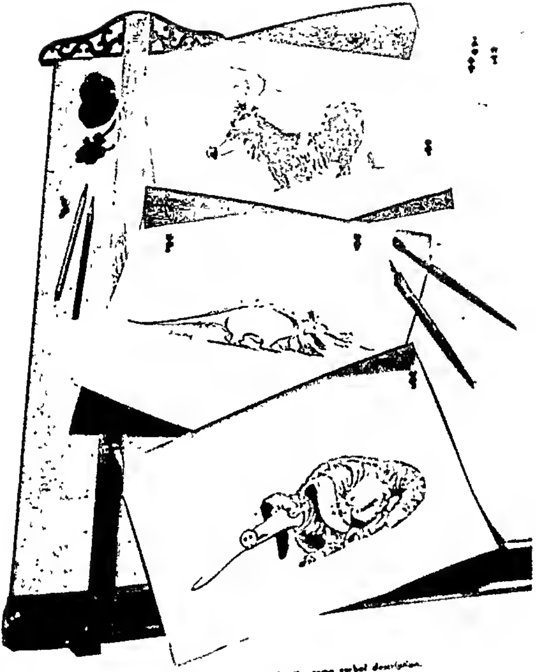

Fig. 2.1. These three drawings were inspired by the same verbal description.

If such variation in interpreting the printed word is apparent among adults, imagine what bewilderment can arise in the minds of younger, more naïve learners.

Why do these difficulties occur? This challenging question confronts

every teacher who attempts to unravel the problems he meets in the classroom.

Learning is a complex process. To discuss such an important process in a short space is to place restrictions on the contemplation of learning principles about which volumes have been written.

It is the purpose of this discussion to describe basic principles of the learning process in terms of their application to audio-visual experience.

Fig 22. Visual experience with the aard-vark gives meanings to the words used to describe it.

PERCEPTION—FOUNDATION OF LEARNING

Our perceptor sensory mechanisms are our continuing contacts with our world of things and events. The eye, the ear, the nerve endings which respond to pressure, to heat and cold, and to odors and tastes are the means through which almost all learning is accomplished. They are the means of perception.

In perception we apprehend objects or events. When we perceive, we translate impressions made upon our senses by stimuli from our environment into awareness of objects or events. . . . The objects and events of which we become aware are regarded in perception as present and as going on. This activity of perceiving is such a universal and intimate feature of our mental life that it is often difficult to realize that objects of the physical world do not merely present themselves and that we do anything more than open our minds to receive them as they really are. It is easy to overlook the fact that we construct our world of things and events out of our sensory processes and that physical objects as we know them through sight, sound, taste, smell, and touch are products of our own perceptions. . . .

Widely differing qualities of sensory experience depend upon the organs of sense and upon the nervous system. They are the basis of our knowledge of the world about us. Without them, there would be no awareness of anything.[3]

[3] Howard L. Kingsley, *The Nature and Conditions of Learning*, Prentice-Hall, New York, 1947, p. 262.

The normal learner, insofar as the functions of his perceptor mechanisms are concerned, gains understanding in terms of multiple impressions recorded through eye, ear, touch, etc. These functions do not occur in isolation but rather through a blended pattern from any or all of the perceptor mechanisms that are stimulated by external occurrences.

Understanding results from coördinated perception. This phenomenon is proved by cases in which physical impairment of one sensory receptor eliminated the possibility of a complete perception pattern. Case records tell of vision being restored to persons who were born blind. Upon receiving sight these persons at first experience a confused array of colors, strange shapes, and shadows which they are not able to understand or interpret.

> One such person was given sight at the age of eighteen by surgical operation. He reported that when light first flooded his eyes everything seemed hazy with no definite forms or arrangements. . . .
>
> The doctor took him to a window, and asked him if he saw the hedge across the street. He replied, "No, sir," for he had no idea which among the many strange forms was the hedge. He had to learn what a hedge looked like.[4]

This man had no doubt heard the word "hedge" many times in the eighteen years of his blindness. Actually he had attained no true understanding of the word. *Complete understanding depended upon other perceived experiences, the most important of which was visual.*

Other evidences of partial or incomplete perception reveal similar conclusions:

> When a man is blind, he does not always see things as they actually are, but one thing is evident. He instinctively attempts to get a mental picture of things.
>
> The blind picture people as having identical masklike expressions. Since facial characteristics are not apparent to touch, they cannot visualize frowns, smiles, or expressive eyes [see Fig. 2.3]. Neither can they understand why a man's face or shirt seems a different tone since both are called white.[5]

Effective perception is thus a blending of sensations which then gives rise to thoughtful shuffling, arranging, and selection of a pattern. This

[4] *Ibid.*, p. 273.
[5] *Sales Management*, June 15, 1949.

Fig. 2.3. The blind imagine people to have similar expressions.

pattern may be thought of as an understanding of an event or object. The process may be visualized as shown in Fig. 2.4.

PERCEPTION—BASIS OF THINKING

Adults, of course, are better thinkers than children, for the latter are guided in their thought by literal applications or limited applications of perceived experience. In thinking, the learner is limited by the number,

Fig. 2.4 Understandings emerge from experiences.

variety, and scope of perceptions already experienced. Thus the learner who has it within his ability to draw upon a wide variety of background experiences which he can recall at will is apt to be more effective in his thinking than the learner who does not have this broad background.

Fig. 2.5. Concrete experiences with wool help these learners to develop understandings.

During the thinking process the learner is ordinarily confronted by a problem to be solved. If the problem is clearly understood, if it is interesting and challenging to the learner, if it is not so difficult as to discourage him, he will begin to search for and select appropriate understandings which may apply to the ultimate solution of the problem. He will be able to *recall* understandings, or he may have to search for new information through *new perception*—reading, interviews, observation, and examination. Soon he will choose an answer, or, failing to do this, he will give up and leave the task unfinished.

What actually happens in such a thinking process may be illustrated by a second-grade child's search for understanding of how wool is grown and made into the cloth out of which his own clothing is cut. (See Fig. 2.5.)

In the intermediate grades children study the story of wool and woolen textile manufacture. Few children approach this study with much more than a superficial experience with wool.

A child may touch the woolen fabric of his clothing and get experience with texture. He may observe the fact that the cloth, first seen as a gross mass, is made up of tiny threads. On pulling one of these threads apart, be can see the minute but single strands of wool. His interest may be aroused.

Immediate understandings of color and texture, even a superficial understanding of what weaving means, have been gained through first-hand perception. Questions come to mind. How are the various colors added? What is the relationship of the single fiber to the little bundle of fibers which make up the thread?

To answer these the child begins searching through his own past experiences with woolen fabrics. He may recall none; but if he is interested, he will respond to his own need or to his teacher's suggestions that he gain further experience with wool.

What avenues are available to him?

He may read. But as he reads, he will find that be is taken farther and fartber afield from first-hand experience. In trying to understand such words as "Australia," "sheep ranch," "wool exchange," "warp," "woof," "shuttle," "shears," and *a* host of other new symbols with which he may or may not have associated understandings, he may become more bewildered than challenged.

At this point he must have opportunities for additional real experience or perception. A visit to a farm to watch sheep being sheared or to a factory in which woolen things are fabricated would be valuable. Someone from the community might be invited to the classroom to demonstrate the hand carding, spinning, and weaving of wool, and at the same time answer questions the children ask. A museum might be visited.

The child whose curiosity has been aroused will respond enthusiastically to perceptual experiences. In this case additional experiences with wool will help him achieve varied understandings of the processes involved with wool and will allow him to draw conclusions as the result of his continued thinking about wool. If children do not get the new experience that is needed, incomplete or half learning will result.

Usually the difficulties of thinking and problem solving mount as the

problem to be solved concerns things that are increasingly remote from opportunities for first-hand experiencing. The middle-grade child who is trying to gain an understanding of life in some remote area of the world is faced with greater barriers than is the child who wants to know more about plant life in the family garden.

Consider the learning problem of the child who attempts to understand life on the desert. He is told that people who live in desert countries live in "barren areas." He may be asked to describe "a sandstorm."

What understandings does the child who lives in our Middle West have which will help him to describe a desert sandstorm? His immediate perceptions may include the sensation of a grain of sand in his eye. A trip to the beach may have acquainted him with the feeling of sand on his arms and legs. He may have experienced high wind. Yet these dissociated experiences may not parallel very closely the sensations he would have if he were in the rocky, barren south slopes of the Atlas Mountains, standing in the swirling, dry topsoil which infiltrates everything as a seventy-mile-an-hour wind whips relentlessly across the surface of the land.

The thinking teacher will sense the child's need for further experiential backgrounds. Obviously the most effective thing would be to transport the children to the desert, to the south slopes of the Atlas range. This, of course, is impossible. The next best thing is to contrive experiences. A feeling for the locale might be achieved through the construction of a model. Carefully selected photographs, both black and white and colored, would help as they were examined and discussed. An authentic sound motion-picture document about life in this desert region would add understanding. By contriving visual and auditory impressions of environmental situations it is possible to supply "real" or concrete experiences upon whose basis a more accurate understanding may be gained of life in an open desert. *From these understandings, the sorting, associating, discarding processes of thinking may then proceed.* The process may be visualized as in Fig. 2.6.

The orderly process of thinking involves the selection of the understandings which apply, and the discarding of those which do not apply, in the solution of a problem. The basis for thinking is a body of understandings from among which selection may be made. Understandings are the outcomes of perceptual or real experiences with events or things.

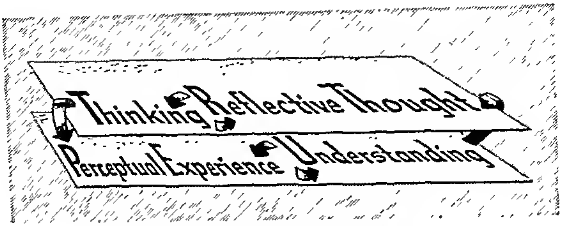

Fig. 2.6. Understandings become the basis for thinking.

Thus the basis for thinking is a broad background of perceptual experiences.

In a complex world environment where the learner is often unable to have had a wide range of personal perceptual experience, audio-visual materials may be useful in simulating many desirable and needed perceptual experiences.

PERCEPTION—BASIS OF ATTITUDE FORMATION

What is an attitude?

Many descriptions of attitudes might be quoted. One which serves our purpose well has been voiced by Gordon W. Allport: "An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related."[*]

How may this definition be applied to the question of how children form attitudes toward frontiersmen or pioneers? Attitude formation may start during conversations around the dinner table as children listen to parental views. A scoffing remark about the Thanksgiving Day celebration may lastingly influence one's regard for pioneers. The feelings the parent expresses as he speaks about Thanksgiving and the pioneers may later arouse or deaden the child's desire to investigate American history. A child's awareness of the idea of "frontiersmen" or "pioneers" may spring from purely emotional experience gained in home conversations about the subject.

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[*] Gordon W. Allport, "Attitudes," *A Handbook of Social Psychology*, Clark University Press, Worcester, 1935, p. 810.

At school, on the other hand, "the pioneer idea" will most likely be studied in connection with concrete and verbal experience. During this study, meanings, associations, and the attitude ultimately adopted may change drastically.

Classroom study situations can create understandings about pioneer life through realistic and concrete experiences. Concrete experiences may include models of pioneer villages, and trips to the museum to examine pioneer home construction, costumes, utensils, and other things related to frontier living. A well-planned bulletin board with illustrations can help visualize pioneer life. A motion-picture film can reveal a reconstructed frontier village complete with people who talk in the pioneer way of speaking. These added experiences and understandings can alter a pupil's original attitude or create an entirely new one.

On the basis of such learning opportunities, a pupil can compare life today with frontier living a century ago. The understandings he selects from his experience, and the associations he builds in attempting to understand living conditions *then* and *now* will ultimately modify his whole

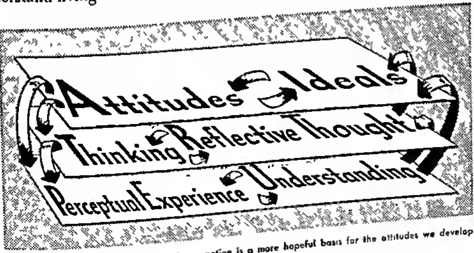

Fig. 2.7. Reflective thinking rather than emotion is a more hopeful basis for the attitudes we develop

"feel" or attitude toward the pioneers who opened the West. The child of today may gradually begin to associate the life of the pioneer with democratic purposes. Attitudes based on imitation or emotion give way to those which the learner himself forms on the basis of his new concrete experiences, understandings, and thinkiag.

The diagrammatic representation in Fig. 2.7 shows the multidirectional relationship between attitudes, thinking, recalled perception, and con-

crete experiential backgrounds. Although the diagram shows three levels —perceptual, thinking, and attitudinal development—all are endlessly intermeshed and interrelated.

THE INTERRELATED PROCESSES IN LEARNING

As a young learner attacks a problem through thinking, he may be influenced by an attitude of mind that is well established, if only on an emotional basis. He will probably begin to search for additional understandings. He may gain these through interviews, through reading, through discussion, or through concrete experiencing. If he is an orderly thinker, he will then select the data that fit his purpose and apply them in the solution of his problem.

Members of a junior-high-school class were asked at the beginning of a unit of work to express their feelings toward colored people. The predominant attitude revealed that most of the children felt very superior to these people. When they were asked to describe colored people, their responses included such words as "not too bright," "entertainers," "servants." Most of the students described the colored person in terms of a stereotype.

Following additional discussion, the group admitted that it needed more information. Books were consulted, biographical accounts about famous colored people were read, two filmstrips[7] were selected which visualized the similarities and dissimilarities among the peoples of the world, and several carefully selected sound films[8] were shown which transported the audience into parts of the world where colored people live.

The stereotype idea was soon exploded. Even casual examination of the film material revealed startling anthropological differences among colored people.

Photographs of Negro architecture were studied. Specimens of handcraft, sculpture, carving, and art were examined. Students who previously had been very dogmatic in their assertions showed evidences of doubt about some previously held beliefs. Carefully planned classroom

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[7] *We Are All Brothers*, 54 frames, Silent, B&W, Public Affairs Committee; *Man, One Family*, 57 frames, Silent, B&W, Film Publishers, Inc.

[8] *Watussi of Africa*, Sound, B&W, 11 min., Encyclopædia Britannica Films; *Pygmies of Africa*, Sound, B&W, 17 min., EB Films; *The Mangbetu*, Sound, B&W, 10 min., EB Films.

procedure had begun to modify the imitated or emotional attitudes of the students.

In another situation a group of tenth-grade pupils studying economic geography expressed great surprise when told that the highest per capita development of hydroelectric power was not in the United States but in Switzerland. The preconceived attitude that Americans are superior was so firmly ingrained in the minds of this group that actually seeing a sound motion-picture film[8] which showed many electric ranges, electric lights, and radios even in the most remote Swiss chalets *was not sufficient to alter this original attitude in many of the students.* Further discussion, further reading, further reference to simulated experiences were required to alter the prejudice of the group.

In another group of upper-intermediate-grade children the attitude that people who live far away must therefore be very unlike them was held so completely that they at first failed to accept some of the obvious similarities which exist. During a study of the people of Chile, the similarities between the San Joaquin valley of California and the fertile central valley of Chile were being discussed. Even in the face of this, these twelve- and thirteen-year-old children held a persisting attitude of "foreignness" toward Chileans. After having seen a 16 mm. sound film which showed women in Chilean households preparing the noon meal and cutting such vegetables as carrots, peas, beans, and others familiar to every class member, most of the group were unable to identify the vegetables. To them the obvious was "too simple." It just could not be that people who lived 4000 miles away cultivated and ate some of the same vegetables that are raised in the United States. However, further discussion and additional showings of the film dispelled the false impressions.

In the classroom the teacher has an opportunity to approach the problem of modifying, influencing, and actually building socially desirable attitudes. That this can be accomplished through carefully planned learning situations has been brought out. Attitudes can be formed or at least modified. By supplying positive and graphic opportunities for understanding, a reservoir of readiness can be established. This background of "learned" understandings may allow for thoughtful sorting, arranging, and testing. Thus real "experience" is perhaps the classroom's most hope-

[8] *Children of Switzerland,* Sound, B&W, 11 min., EBF.

ful avenue through which we can help influence children as they think their way toward socially desirable attitudes and patterns of future action. Through these carefully planned classroom learning opportunities we can more effectively provide students with materials for discriminating thinking when they deal with the problems of living and acting in both the present and the future.

This is the high social purpose of education.

Effective instructional techniques depend greatly upon providing young learners with wide varieties of participatory experiences. When children begin their school life they have the opportunity of examining the world about them through direct observation. They may take field trips in the community. They may visit the water plant, the post office, the corner grocery store. They may engage in conversation with the people who operate local industries. All this very effective learning is accomplished through seeing, hearing, feeling, manipulating, and examining. It is nature's own way of learning—by seeing and hearing simultaneously, by becoming "aware" through the interdependent functioning of these two primary sensory receptor mechanisms, the eye and the ear. Through concrete, first-hand impressions young children become familiar with the world about them.

UNDERSTANDING IN READING

We soon recognize that among average children in the first grade those who have many first-hand experiences often make most progress in learning to read. As these first-graders begin to read, they read about things they have experienced. The words they see soon become associated with these experiences. The child discovers he is able to gain comprehension in reading because he associates more and more experiences with the symbols which stand for them.

Thus it is that the importance of supplying the child with many first-hand experiences far exceeds the literal kinds of symbols that he is attempting to understand or comprehend. The symbols which he attempts to interpret might as well be German, French, English, or Sanskrit. It would make little difference. The important thing for the teacher to remember is that experiences must precede the abstract symbol which the child is attempting to understand. A first-grade teacher expressed it this

way: "I know better than to place a book in the hands of a beginning reader and say, 'Turn the pages, boys and girls. We will begin to read.' Rather than this, I first take weeks and even months to arrange many kinds of first-hand experiences for the child. Out of these experiences, understandings are gained. We talk about these understandings; we act out little plays about them. They become the subject of our day-to-day conversation, and only after this do we turn to the printed page and attempt to relate understandings to the symbols which appear on these pages."

The importance of suitable readiness experiences in learning to read may be illustrated by observing the difficulties and successes of children as they read.

Some processes of reading are very complex. It may be wise, therefore, to recall your own experiences with reading by placing yourself once again in the position of the beginning reader. As you try to capture some of the feelings of the first-grade child when he confronts the alphabet and reading, the following may be helpful:

Imagine that this is your first contact with a new alphabet, or at least a new version of a familiar one. Study the following alphabet for not more than a minute or two.

aɪ	(as in aisle)	aɪl	e	(as in data)	de̱tə
ɑ	(as in calm)	kɑm	ə	(as in data)	detə̱
aʊ	(as in now)	naʊ	i	(as in unique)	unik
ʊ	(as in put)	pʊt	ɪ	(as in in)	ɪn
u	(as in true)	tru	j	(as in your)	jʊr
ʌ	(as in cup)	kʌp	ð	(as in these)	ðiz

Now as a beginning reader might, go directly to reading this "primer level" story.

aʊr stʌdɪ ʌv wʊl

wi kom ðə wʊl.
wi juz kɑrdz tu kom ðə wʊl.
wi kom ðə wʊl tu mek jɑrn.
wi mek jɑrn aʊt ʌv komd wʊl.

As you read this story, did you make sense out of the words you "spoke"? Did you stumble, repeat, refer to the alphabet, or become annoyed as a child might? Now turn the page.

Fig. 2.8.

Study the picture. Examine it carefully. Ask yourself what meanings it reveals. Now read the primer story under the picture.

aʊr stʌdɪ ʌv wʊl
wi kom ðə wʊl.
wi juz kordz tu kom ðə wʊl.
wi kom ðə wʊl tu mek jarn.
wi mek jarn aʊt ʌv komd wʊl.

No doubt, you read more successfully because of understandings gained from the picture. As the meanings of the picture became available to you, you applied them to words in the story which related to them. Thus, you discover that readiness experiences which precede reading, *per se*, provide clues to reading and to the process of attaching appropriate meaning to words. Whether the words are in English, phonetic symbols, or Sanskrit actually makes little difference.

The second illustration of the need for understandable readiness ex-

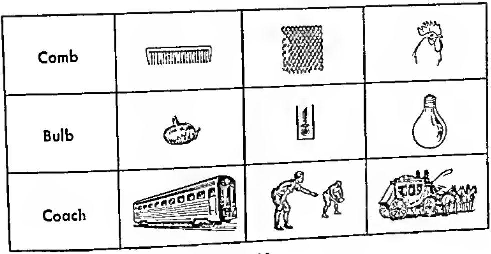

Fig. 2.9.

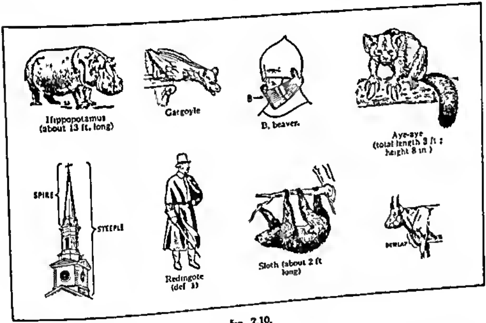

Fig. 2.10.

periences is readily available in the *Thorndike-Barnhart Beginning Dictionary.*[10] Fig. 2.9 shows how this dictionary quickly and clearly explains the several meanings of single words. In Fig. 2.10 we see how the high-school version of this dictionary[11] conveys in a concise and clear-cut manner the meaning of some unusual words for which learners may well

[10] *Thorndike-Barnhart Beginning Dictionary*, Scott, Foresman and Company, 1952.
[11] *Thorndike-Barnhart High-School Dictionary*, Scott, Foresman and Company, 1952.

not have appropriate background readiness experiences. The use of pictures to establish understandings of things we read about is an integral part of the reading process.

Pictures, however, provide only one approach to reading readiness and understanding. There are many others—field trips, films, and filmstrips, for example—which under certain conditions are even more valuable, not only to reading but to the successful accomplishment of related school activities.

As the child studies more complex subjects in school, he needs greater opportunities for gaining many kinds of understanding through experiences related to the mastery not only of reading tasks but of concept understandings and skills in the social studies, science, creative art, and language.

How can we be sure that the written word brings him the exact idea the author had in mind, the author who has been there, who has seen for himself? Children seldom have had the experiences an author writes about. Often the author's words may set the child to thinking about an altogether different experience from what the author meant to report. Frequently a given word becomes associated with what the adult calls a "wrong" experience. Out of these circumstances we see the poor reader emerge, the child who is content to sit in the corner and remain silent.

The first-grade child who said that her younger sister was "double years old" related her own "twice as much" understanding of the word "double" to the fact that her one-year-old sister had passed her second birthday.

The urban youngster who reported that she reached adolescence before discovering through first-hand experience that a cow was bigger than a mouse had read the story of dairying in complete absence of anything but literal interpretation of the cow-and-stanchion photograph in her second-grade reader.

The third-grader who was bewildered by the story of the boy on the bicycle who always rode "ahead" was applying literally his understanding of the word "head." Little wonder that he saw difficulty in riding a bicycle and a "head" at the same time.

Often in the transition from the storybook, fairy-tale literature of the pre-primary and primary level, children find it difficult to accept the reality of things they read about in upper-grade books. Reading material

about people and events in remote places is often only partially understood because the child has had little or no concrete experience from which to gain an understanding of the words he meets.

A boy in the fifth grade, after reading a chapter on the pygmies in Africa, in all seriousness questioned the existence of such places, things, and, most important, people. His earnest question, "Are they like fairies?" revealed his skepticism.

A junior-high-school child returning from a trip east hesitatingly admitted a feeling of disappointment when, on entering what her geogra-

Fig 2.11. *These are the basic textbooks only, not library and resource books, which an elementary-school child is expected to read with comprehension as he goes from first to eighth grade.*

Authors use words to stand for experiences they describe in books. The teacher's responsibility is to provide experiences which will give readers an understanding useful in finding the author's word meaning. It is here that wisely selected audio-visual learning materials can make a tremendous contribution to success in reading comprehension and vocabulary.

phy book had described as "heavily industrialized New England," she rode instead through vast stands of virgin timber and mountain terrain. When asked what she had expected, she replied, "I had read about the heavily industrialized New England states. Industry means factories, and I didn't see any." This girl expected some great change representing industrialization to occur the moment the car in which she was riding crossed a state line. Similar misinterpretations arise in attempts to understand such common phrases as "famous for citrus fruits," "famous for textiles," etc.

To vocalize the sounds of the printed word symbol without associating a meaning with that symbol is pure verbalism. To pursue reading *per se* in the absence of wide readiness experience in the first grade, junior high, or high school is the academic crime of verbalism—verbalism which refers to reading as a mechanical thing without understanding. *Children and young people who read must first have wide opportunities for the direct experiencing or contrived experiencing of the things, events, processes, or ideas to which the printed symbols refer. It is only on the basis of experiencing that the printed symbol can take on comprehension or understanding.*

The meaning of the printed word is almost always associated with previously gained understandings, most of them concrete. *Just as the primary teacher acknowledges that before the word must come the idea, so in all aspects of learning, upper grades and high school, each teacher must assume the responsibility for being sure that the background experiences which underlie the comprehension of the printed word are provided for the conscious experiencing and understanding of the student.* This is as true of a second-grade social studies pupil as it is of the college freshman enrolled in biology, mathematics, or the social history of the United States.

EXPERIENCE AND CREATIVE EXPRESSION

Children of relatively equal intelligence will vary in their enthusiasm for entering into a conversation, making a report, or participating in recitations very largely in terms of the ideas they have. The child who comes from a home where the family conversation includes him, where good books are available, where vacation trips are often taken, will have a decided advantage over the child that does not have these opportunities.

An art teacher in a large midwestern city was asked what relationship she thought existed between experiential background and artistic expression. Her reply indicated that, on the basis of her observations of children's ability and art, she was convinced that there was no such thing as creativeness *per se*, but rather that the child who had wide experience with things had lots of ideas to put down on paper. Similar observations have been made concerning written composition. The child who has had much experience with things and events usually is not at a loss for a subject to write about; the reverse is true of the child who has not had the advantage of wide experiencing.

OVERCOMING SOME BARRIERS IN TEACHING

Teachers in the modern school create innumerable situations for realistically bringing an understanding of the world to children. But ask any teacher the question, "Are you satisfied with what you are doing?" and she will say, "Yes—reasonably so—there are many things that I know I should be doing, but I cannot for one reason or another."

If this point is pressed, the conversation may proceed like this: "I can't do much about taking my children to 'faraway places.' Reading is too often the only medium through which I can give the children experience with the cultures, peoples, vocations, and home life of other lands. I realize that no child can attach real meaning to this verbal experience—he hasn't really seen, really known these people; the words are, well, just so many words. The child who has never seen the home of an Indian farmer in the Punjab, the child who has never been in the home of a Greek farm family on the barren slopes near Athens, the children who have never lived on the south slopes of the Atlas Mountains—well, how can they know? Often I wish I could do something about this, but I realize that it is relatively impossible, so I just do the best I can."

A little way down the corridor another interview reveals a similar feeling of inadequacy: "It's like this. In the spring we begin talking about the growth of plants or the life cycle of insects. We want to learn just how all this happens, but we can't watch things grow. It happens too slowly. Suppose we planted a seed in the window box over there. In order to watch that seed actually grow we might have to say, 'Johnny, you take the 12 to 1 o'clock shift; Mary, you take the 1 to 2 shift; Betty, you take the 2 to 3 shift,' etc., around the twenty-four hours. That would be impractical if not impossible. If we want to watch the butterfly as it

emerges from its cocoon, we'd have to post a twenty-four-hour watch in our classroom so that someone would always be there to sound the alarm when at last that marvelous event, the 'breaking out,' occurs. Oh, there are many things in science that we can talk about. If there were only some way to see them all happen. I guess that is one of those impossible things. We'll just have to do the best we can."

And an interview with the history teacher in the high school goes something like this: "Every time we work at the unit on westward expansion we talk about covered wagons, sod houses, and Sutter's Mill. We speak of such terms as 'privation,' 'frontier spirit,' 'hardship,' 'individualism.' I see the puzzled frowns on my students' faces, and I say to myself, 'If I could only turn back the clock. If I could only take these students *to see the things we are talking about.*' But we can't, so we make the best of the job by turning to the pages of our textbook and looking at the crude woodcuts and the line drawings which adorn them. If only we could have real, living, background experiences of our own. If only we could know the actual experiences these pioneers had. What a way *that* would be to study bistory!"

The home economics teacher reports: "Too often I feel that we are just mixing ingredients. We put in so much of this and so much of that, set the oven at the proper temperature, and presto, out comes the finished product. For most of the youngsters, that is all right. It's just do this, do that, and you get the results. But more and more youngsters are becoming curious. They want to know *how* this happens. I do the best I can by explaining about the leavening processes, abnut the action of shortenings on the tiny granules of starch, but something seems to be lacking. I can't always be sure that the thing I see in my own mind is being understood by the children. I guess there isn't too much I can do."

All these traditional barriers to complete experiential learning have long been recognized. There are beginnings that any teacher can make regardless of the classronm situation in which he finds himself. He can examine the use he makes of the blackboard. He can investigate the community for field trip possibilities. He can start making his nwn file of mounted pictures, and pay more attention to the bulletin boards he arranges.

But today, among the many things that are credited to the genius of twentieth-century man, a new science nf education is emerging—the science of audio-visual education. It is the means by which the experi-

ences of the world, regardless of whether they existed in the past, are apt to exist in the future, or exist now in some remote portion of the planet, can be brought into any classroom in any community. Through the medium of the filmstrip, the motion picture, the transcription, the radio, television, and the slide—through the teacher's opportunity to handle creative activities in any of these media, we can investigate the outlying reaches of our physical world. The physical environment, whether it be "too big," "too small," "too fast," or "too slow," can be captured for study and restudy. Knowledge about the world can be made available to the smallest class in the most remote school in the country at the exact moment of need—all at the click of a switch.

The youth who come to our schools today are living in a world in which all the people face the problem of survival. They must know not only what Pumpkin Hollow raises as its chief products but that new air terminals have been built in central China. They must know why automatic voting machines are being adopted and why children in some lands are starving or in need of educational opportunities similar to those that are guaranteed to all the children in the United States. They must know that in India the untouchable caste has been legislated out of existence and that at least a minimal public education is now provided for all the children. Most important, they must understand the implications of all these circumstances and events for the world they will enter as adults. Upon their shoulders the responsibilities of tomorrow will fall.

The modern school plant has become the place in which pupils learn, experience, prepare for, and understand their place in tomorrow's world. The school must reveal the living world of today if it is to help build the kind of civilization we wish to guarantee for tomorrow.

It is the purpose of succeeding chapters in this book to investigate the degree to which the traditional and current problems of education can be made more graphic, more effective, more meaningful, more likely to become an integral part in building the attitudes which the children of today must have if they are to function effectively in the complex, unknown world of tomorrow.

SUMMARY

Our understanding of events, places, and objects is a direct outgrowth of our ability to perceive. Our perception of things depends on our ability to see, hear, touch, taste, and smell. As individuals we gain an

understanding of our surroundings through the interplay or interrelationship of our own sensory perceptor organisms.

The basis of all understanding, thinking, and attitude formation is real experience. In a world which is daily becoming more complex because of the growing interrelationships of man, the child in school needs to know more about his entire environment. Because in this complex world the learner is unable to have a wide range of first-hand or real experiencing, the problem of the teacher becomes more complicated.

The responsibility for providing first-hand experiences which may lead to understanding affects many areas of the curriculum.

Other things being equal, the child who is a good reader will succeed in terms of his readiness or background experiences. On the basis of many and wide experiences he will be able to associate meanings with the words which symbolize or "stand for" these experiences.

The child who is asked to express himself through the medium of art, drawing, oral or written communication, etc., needs to have many first-hand background experiences. The child who has many of these experiences is more likely to succeed in creative expression because he has many understandings based on perception from which to draw his creative ideas.

In our schools we are investigating a complex physical and social environment often characterized by phenomena which are too big, too small, too fast, or too slow to be captured for classroom study. Frequently distances interfere with first-hand experiencing. In this kind of complex world the role of contrived experiences becomes very important to classroom procedure.

Suggested Activities

1. Select a description of some little-known object from an encyclopedia. Read it to your classmates. Ask them to "rough sketch" their visualization of this description. Examine the sketches for evidences of differing background experiences.
2. Examine the learning objectives listed in a typical unit of work in a course of study in a subject area in which you are interested. As an alternative, analyze some of the study questions at the end of a typical chapter from a textbook in a subject you are interested in. State the background perceptual

experiences a learner must have in order to respond intelligently to the activity in question.

3. Arrange to view a 16 mm. sound motion-picture teaching film Select a film you are interested in, such as one of the following:
   Benjamin Franklin, B&W, 18 min., Encyclopædia Britannica Films.
   Eli Whitney, B&W, 18 min., Encyclopædia Britannica Films.
   Henry Wadsworth Longfellow, B&W, 18 min., Encyclopædia Britannica Films.
   Desert Nomads, B&W, 22 min., United World Films.
   Farmers of India, B&W, 22 min., United World Films.
   a. Before seeing the film, list not more than a half dozen impressions or understandings you have about the subject.
   b. After you have seen the film, make a list of specific new understandings or changes in attitude that you have experienced as a result of viewing the film.
   c. What generalization can you make about the teacher's responsibility to provide audio-visual readiness experiences not only in film form but through other audio-visual devices?
4. Interview a primary-grade reading teacher, and ask the following questions:
   a. What readiness activities do you help children engage in before attempting beginning reading?
   b. What is the relationship of readiness activity to success in reading?
   c. Are home backgrounds (presence of good books in the home, family travel, family group conversation) reflected in children's reading success?

   Report your interview to your classmates. What conclusions do you have? Conduct similar interviews with teachers of art, social studies, etc. Formulate similar but appropriate questions for your interviews.

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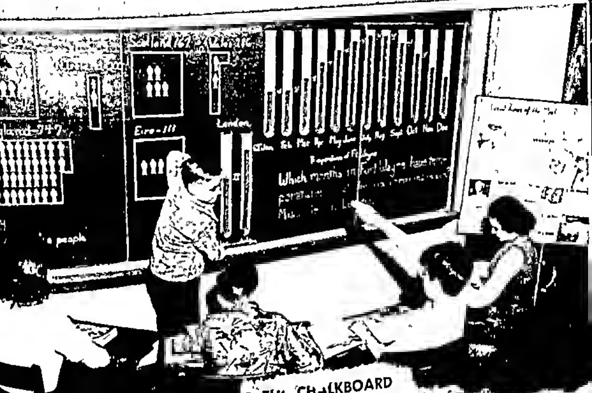

G THE CHALKBOARD

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SPACE

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THE CIVICS CLASS WAS OISMISSED. THE PRINCIPAL MOVEO FORWARD TO discuss his observations with the teacher.

"A fine lesson, Miss Jones," he said and, after a pause, "As you were explainiog the organization of the Supreme Court, it occurred to me that a diagram on the chalkboard might have helped."

Miss Jones considered this a moment. "You're right—and the same thing could have been done to explain the cabinet functions. But I feel so helpless when I attempt to use tbe chalkboard. I guess I'm not—well—just not artistic."

For hundreds of years the chalkboard has been a basic means of instruction. All during this time, teachers have been using it with varying degrees of success. Too often they have shunned its use because they felt as Miss Jones did. This need not be the case. It is the purpose of this chapter to describe chalkboard techniques which are easily and effectively used and which are within the ability of any teacher.

Guide for Planning School Plants: "New demands for light reflection in the classroom and avoidance of dark areas are being successfully met by the new light-colored chalkboards. The best of them give good visibility, are durable, and contribute to the attractiveness and eye comfort of the classroom. Such light chalkboards should replace blackboard. Sixteen to twenty lineal feet of chalkboard is generally sufficient for an elementary classroom."[1]

In classroom situations demanding specialized use of the chalkboard, adjustments in terms of size, position in relationship to viewers, and other considerations call for special installations. Regardless, however, of its many forms, the chalkboard continues to be an integral part of the classroom environment. An effective chalkboard has the following characteristics:

1. It provides maximum contrast between background and line drawing or printed symbol.
2. It eliminates glare. This was a common problem with the traditional smooth-ground blackboard surface.
3. It is colored to blend with the interior room decoration and create a restful atmosphere. At the same time it must be efficient in terms of visual characteristics. Chalkboards are usually pastel green, yellow, or black.
4. It is mounted so as to be within easy arm's reach of the pupils. The mounting will vary, depending on the age group using the chalkboard.

TECHNIQUES FOR USING THE CHALKBOARD

A basic understanding of lettering, of preparing the chalk, of making simple line drawings, and of creating more complex visualizations by means of the special chalkboard techniques about to be described should give any teacher reasonable facility in creating myriad chalkboard study opportunities for the children who work under his guidance.

SELECTING THE CHALKBOARD SPACE

Choose a section of the chalkboard which can be easily seen by all the children. The angle from which the children view the chalkboard must

[1] National Council on Schoolhouse Construction, *Guide for Planning School Plants*, Nashville, 1949, p. 44.

not be too acute; they should have as "front-on" a view as possible. In all cases, portions of the blackboard which reflect a light glare from windows or artificial sources should be located; the situation should be corrected by means of sun curtains, changes in seating, additional artificial lighting, or replacement of the chalkboard surface with the new glareproof material. Use the following simple test in choosing the best chalkboard space:

Write a few words or draw a simple sketch on each chalkboard panel. (This may seem repetitious, but it is practical and worth while.) Walk around the room and view the entire chalkhoard space from at least five key positions in the seating area. The presence of glare caused by unfortunate angles of light and seating will be apparent. Today, fortunately, most chalkboards are relatively free of glare, but in classrooms that have the old smooth-surface types it is necessary to consider glare and seating.

On the basis of your test, determine the space on which the words and drawings are completely and comfortably visible.

PREPARING MATERIALS

The chalkboard should be thoroughly clean. Before using a panel of the board, all excess chalk powder and smudgy surface dust should be removed. Erasers should be cleaned regularly, as should the chalk trough. A uniform downward stroke of the eraser is an effective way to remove old drawings and lettering; avoid a scrubbing or irregular motion. The type of erasure may seem inconsequential, but experimentation will show that greater legibility can be attained on a surface on which uniform downward strokes have been used.

Newer chalkboard surfaces may demand special care. Several types of composition boards which are factory-surfaced with green pigment carry instructions warning against the use of water or liquid cleaners. With a few of the new chalkboards,[2] however, water cleansing agents can be used periodically, but not to the extent that the surface will be worn away by the action of abrasive cleaning compounds. One of the first responsibilities of the teacher is to investigate the cleaning and use of the chalkboards in her classroom. Similarly, the administrator who is purchasing new chalkboards should look for qualities which will provide

[2] See Source Lists, p. 541.

for maximum classroom use. Teacher, children, and school custodian will value chalkboards that are uniform in chalk-holding ability and are glare-proof and chip-proof, whose color is permanent (no streaking or fading,) and that can be cleaned with mild soap or with nonabrasive cleansing agents.

The chalk should be prepared for the various uses to which it is put. Just as pencils are sharpened to flat broad points, sharp points, or blunt rounded ends, so should full-length pieces of chalk be prepared for specific tasks (Fig. 3.1). For harsh outline work the chalk should first be

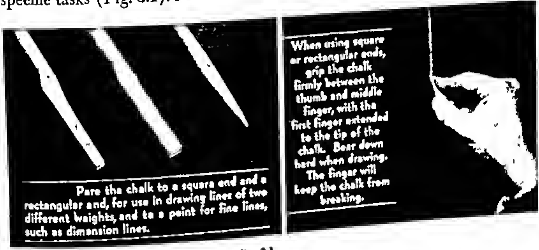


Fig. 3.1.

scraped over coarse sandpaper to produce a blunt-angle end surface. For detail shading or faint guide lines the chalk should be sharpened to half its original diameter. For shading, grasp the chalk so as to bring the longest surface against the chalkboard. Use chalk which is neither crumbly nor extremely hard. Use a large piece of chalk. The last "pin-point remains" of the chalk should be discarded.

HANDLING THE CHALK

In the primary and intermediate grades, regular amounts of time are spent in penmanship and the correct manner of handling pencils, pen, and ink. Similarly, some time should be spent in learning to handle chalk, for there is a correct way of using it. A few practice strokes will help you to use it effectively.

Experiment with the chalk, drawing straight lines and circles. For good visibility, be sure to draw lines as wide as the chalk permits.

Just as the art teacher assembles brushes, paints, and easel and learns their use, so you will become more effective in using the chalkboard by providing yourself with chalkboard rulers, compasses, templates, stencils, and similar tools, and learning how to use them.

LETTERING

Chalkboard lettering may with reasonable practice involve no more than the mastery of certain basic line-drawing techniques. Good lettering techniques should be used by all teachers.

The most expert draftsman would not think of proceeding until he has laid out a general plan of work. Block out with thin guide lines the space needed for the lettering. The use of guide lines gives the lettering uni-

Fig 3.2. Firm, broad lettering, and standing to one side of one's work help assure understanding by viewers.

form size and makes it large enough so it can be read easily by a child at the rear of the classroom. Letters should not be less than 2½ inches in height if they are to be visible from the rear seats in the usual 30-foot-deep classroom.

Other things being equal, printing is more legible than cursive writ-

ing. Although many people think that cursive writing is much more rapid than printing, reasonable practice with simple block letters will give amazing speed in printing. Although the letters may appear unusually large to the person who is writing them, an occasional walk to the rear of the seating area will show that they are not too large.

Use enough space on the chalkboard. Do not cramp or squeeze into restricted space material that would be better spread out. Leave a blank space between letters; this will dramatize the drawing or lettering. The classroom teacher will do well to imitate the modern trend in magazine advertising layout which relies on the planned use of blank space as an attention-getting device. A few carefully selected words, dramatically phrased, are more effective than crowded, wordy descriptions.

THE PATTERN METHOD

The pattern technique is well suited for basic visualizations which are needed frequently. The mathematics teacher who is confronted again and again with the problem of explaining line graphs; the music teacher who wants to illustrate note reading techniques; the geometry teacher who needs to use repeatedly various types of triangles, rectangles, and parallelograms; and the social studies teacher who refers constantly to outline maps of county, state, or continent find the pattern technique of great assistance. The pattern method is sometimes called the punch or pounce system.

Fig 3.3. Punch the holes about an inch apart.

Suppose that an intermediate-grade teacher frequently refers to an outline map of her state. Therefore she wants to devise some means of quickly putting this map on the chalkboard. She is not content with guesswork or with the wobbly map produced by freehand sketching. As the first step she carefully draws the outline of the state on a piece of heavy tracing paper. Then, with a leather-worker's punch ⅛ or ³⁄₁₆ inch in diameter she perforates the outline at approximately one-inch intervals, or closer

if the detail of the contours is more complex (Fig. 3.3). Experimentation will indicate how close the holes should be. The distance may vary from a quarter inch to one inch, depending on the nature of the drawing.

When the complete drawing has been "punched out," the teacher holds the pattern against the chalkboard and rubs a dusty eraser firmly across the perforated section of the outline. (Note: The eraser should be rubbed back and forth across the perforations, not patted.) Thus an outline of chalk dots appears where the perforations in the pattern were. She then connects the dots, freehand, with chalk. The entire procedure is shown in Fig. 3.4.

Fig. 3.4. *Left:* Hold the pattern firm. *Center:* Check the line before removing the pattern. *Right:* Connect the dotted outline.

Patterns that are used repeatedly may be mounted on window-shade rollers and filed in an orderly way. They are thus available for use at a moment's notice and they can be suspended easily from hooks along the top of the chalkboard rail. (Commercial patterns are now available[1] for such subject areas as mathematics and geography.)

[1] Corbett Blackboard Stencils, 548 Third Ave., North Pelham, N.Y.

THE TEMPLATE METHOD

The template is another device for drawing on the chalkboard diagrams, symbols, and designs which must be accurate and exact, or which need to be drawn repeatedly.

Chalkboard templates may be made of any thin, stiff, light-weight material—sheet metal, heavy cardboard, plywood, or masonite. The design should be drawn on the material and then cut out (if possible, cut out a handle, too); the template is then ready for use. The template is held against the board with one hand and it is outlined on the board with chalk. Pupils, teachers, and custodians may make templates as the need for them arises. When not in use, they can be hung from hooks attached to the under side of the chalk rails. Templates in use are shown in Fig. 3.5.

Fig 3.5 The science teacher may use templates of beakers, retorts, burners, etc., to visualize experiment setups for the class. In mathematics, templates guarantee accuracy even in quickly sketched figures for theorems.

THE GRID METHOD

The grid technique for chalkboard illustrations is within the grasp of every teacher. The illustration or original drawing may be on any ordinary size of paper, from 3 by 5 inches to 8½ by 11 inches. It is blocked off into squares, which can be ½ or ¾ of an inch, 1 inch, or even larger. Smaller squares are necessary if the original has much detail. The less complex the drawing, the larger the squares may be. The chalkboard is marked off in larger squares. In transferring the drawing to the chalkboard, the teacher duplicates the original, one square at a time, on the chalkboard (Fig. 3.6). The grid technique is

amazingly rapid. A few practice sessions will give the teacher surprising facility in its use.[4]

THE PROJECTION METHOD

The opaque projection technique for creating chalkboard illustrations and diagrams is now easy and effective to use because of the development of more brilliant illumination in opaque projection equipment. With this startlingly simple technique, the pattern need only be focused upon the chalkboard surface in whatever size or dimension is desired. The outlines and other characteristics of the projected pattern can then be traced in any color and in any detail. The opaque projection technique lends itself admirably to pupil participation in the preparation of blackboard illustrations which become part of reports or demonstration displays.

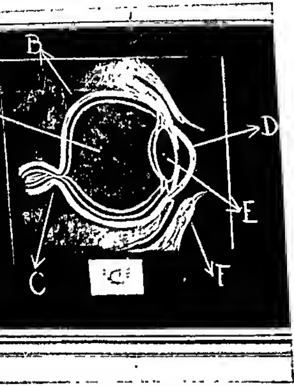


Fig 3 6. The grid method can be used to enlarge a small diagram easily.

Similarly, 2″ x 2″ or 3¼″ x 4″ slides may be projected on the chalkboard and the basic lines and symbols traced with chalk. By varying the distance from projector to chalkboard, the images may be larger or smaller.

THE HIDDEN DRAWING METHOD

The hidden drawing technique is a unique way of coördinating demonstration and explanation, by either pupil or teacher, in practically any subject area. By preparing in advance a series of sequential or developmental illustrations, the teacher can describe and expose one illustration at a time. In this way, attention is focused on the explanation that accompanies the exposed drawing and the sequence can be maintained, since of necessity all eyes are on the chalkboard. Stretching a wire along

[4] *Chalkboard Utilization*, Sound, B&W, 15 min., Young America Films.

the top of the chalkboard and hanging inexpensive cloth from this wire (see Fig. 3.7) make the hidden drawing technique a reality in any classroom.

This technique was used by a biology teacher who wished to explain the food-getting habits of the amoeba. Before the class convened, four carefully worked-out drawings were put on the chalkboard. When the

Fig 3.7. A wire and some drapery material adapt the chalkboard for the hidden drawing technique.

class entered the room the chalkboard surface was completely hidden by the wire-strung green cotton curtain.

When the teacher announced the subject of the lesson, "Food-Getting Habits of the Amoeba," he drew the curtain aside enough to reveal the outline diagram showing the structure of an amoeba. The contours of the cell wall and the location and meaning of the symbols representing the nucleus and the food vacuole were discussed.

The first stage of the food-getting activity was next described as the instructor moved the curtain farther to the right and revealed the second drawing.

As the discussion continued, additional stages in the amoeba's adaptation for food getting were disclosed by moving the curtain progressively to the right. At the end of the explanation the diagrams were "hidden" and the prearranged test was exposed.

In another situation a physiology teacher who was also a coach discussed the relationship of musculature, skeletal structure, and the proper

Fig. 3.8. The use of the "hidden" chalkboard allows the teacher to reveal only those portions of the previously prepared complete sequence of illustrations which are most useful to the discussion of the moment.

use of athletic equipment by means of the chalkboard drawing shown in Fig. 3.8. This drawing was made by using an outline pattern of the human form and lettering it and filling in details as necessary for the physiology class, and later for a meeting with his football squad.

THE COMIC APPROACH

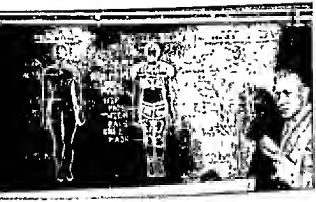
In this day of graphic news and magazine illustrations, both pupils and teachers are well acquainted with cartoon techniques. Examination of popular cartoons will reveal that not all cartoonists are artists. Many cartoons are rudimentary visualizations in which simple lines are used to outline objects. The use of this technique is shown in Fig. 3.9.

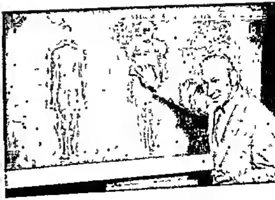
You can draw this well or better. Try it. Apply the cartoon approach to some situation you wish to describe to the class—announce an event, or remind them about the care of the desks, schoolroom, or their personal belongings. Soon you will develop a visual cartoon "vocabulary" of simple line drawings which anyone can use to add interest, fun, and clear-cut visualization to chalkboard learning situations.[5]

THE MAGNETIC CHALKBOARD

New developments in manufacturing permit the production of green or olive-drab porcelain-surfaced steel chalkboards. These types of chalk-

[5] H. E. Kleinschmidt, *How to Turn Ideas into Pictures*, National Publicity Council for Health and Welfare Services, Inc., New York.





boards[6] have characteristics which make possible ingenious applications to teaching and learning.

The surface is composed of fine-textured, almost indestructible, permanently colored particles of vitreous material which takes white or colored chalk impressions evenly and visibly. The porcelain-like surface can be washed, scoured, or "dry cleaned" with carbon tetrachloride to remove permanent chalkboard ink, colored chalk "ghosts," and adhesive materials. The under surface is of steel, which permits the use of magnets on symbols or three-dimensional materials. (See Figs. 3.10, 3.11.)

The steel chalkboard and the adhesives, magnets, etc., are tools which imaginative teachers and pupils can use to create fascinating and highly useful aids to the realization of learning goals.

THE USE OF COLORED CHALK

The use of color in any teaching situation may be desirable for two reasons: Color is pleasing to the eye, and hence is intrinsically interesting and attractive. More important, color is needed in some cases if we are to realize more completely the true nature of things; hence its use contributes to our understanding of objects, processes, etc. Increasing numbers of teachers use yellow chalk on green chalkboards. They feel that its contrast qualities create high visibility.

White chalk gives high visibility when used on a green, yellow, or black chalkboard. For most day-to-day uses—directions, word lists, activity diaries, etc.—white chalk is effective. In certain situations—dia-

[6] See Source Lists, p. 541.

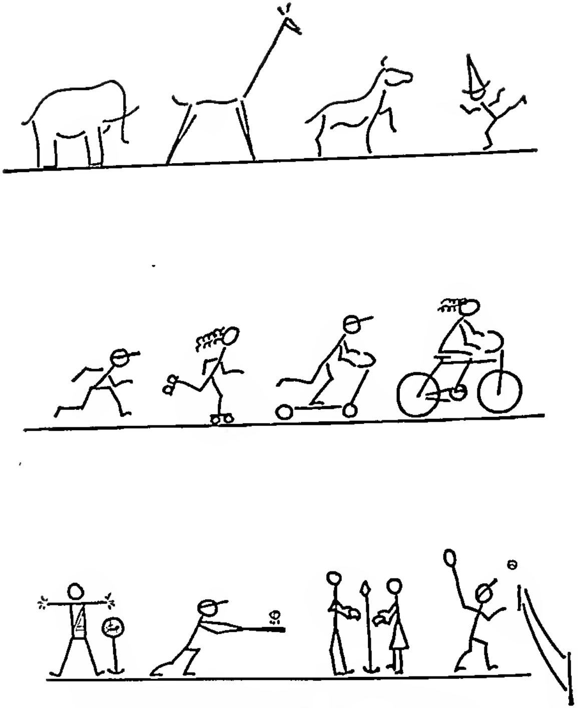


Fig 39. The cartoon technique applied to a parade of animals, pupil-developed safety rules and regulations, and junior-high-school club activities.

Fig 3.10. The steel porcelain magnetic chalkboard. The "permanent" basketball court is drawn with chalkboard pen and ink, magnet held player symbols can be slid quickly from place to place, and unwanted chalk marks can be erased easily. The "permanent" diagram itself can be removed with carbon tetrachloride or other solvent.

grams of things to make, maps, geometric figures, or explanations of how things function—special needs arise which color may meet.

The parts of a flower, such as petal, stamen, pistil, stem, etc., can be more easily distinguished one from the other if different colors are used for each part.

In mathematics the use of color may point up explanations. "Colored chalk is almost indispensable. In illustrating different types of polygons, it can be used to highlight the equal parts. It makes congruency much more obvious and the reasons for certain area formulas more distinct.

"In all types of graphs and algebra, colored chalk is a great visual aid. It is especially helpful when used to explain sign numbers since the direc-

tion sign and the number sign are never confused in explanations because they are different colors."[7]

In social studies, chalkboard murals of people, animals, activities, and objects can be more accurately portrayed in color than in white alone.

Colored chalk should be used when the visualization will take on greater meaning through its use. Color merely for color's sake is a poor argument for the use of colored chalk in the classroom.

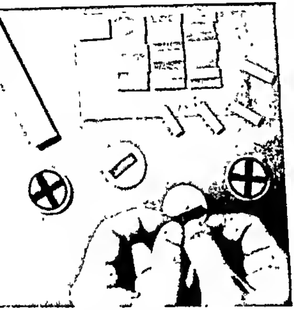


Fig. 311. Any three-dimensional light objects can be mounted with adhesive on small magnets for use on steel chalkboards.

These illustrations of chalkboard techniques have of necessity been limited to a scattered few of the indefinite number that could be described.

With these basic techniques in hand, the teacher is limited only by his own ability to coördinate subject teaching problems with the opportunities which chalkboard illustrations afford. The various techniques outlined above may lead the teacher to realize that he does not need to be an "artist" in order to use the chalkboard effectively.

The use of white on black, or color on a pastel background, or any combination of these can improve and motivate what pupils and teacher plan, investigate, and learn.

THE ROLE OF THE CHALKBOARD IN INSTRUCTION

To attain greatest effectiveness, the chalkboard must carry written or graphic messages that are integral parts of the classroom work being accomplished. Motivational uses of the chalkboard are innumerable.

A primary-grade teacher reports that, before the children come into the room for the morning's work, she writes on the chalkboard questions which she knows will capture their imaginatinn. Recently, in getting

[7] S. E. McCurdy, "Colored Chalk Techniques for Basic Mathematics," *Mathematics Teacher*, December, 19[illegible], pp. [illegible]–371.

Fig. 3.12. Students should be encouraged to use the chalkboard and chalkboard devices to visualize discussions, explanations, and reports. The drawing in this photograph becomes a primary means of communication between these children and the class.

ready for a unit of work on children of Mexico, she included such questions as these:

1. What pets do Mexican children like?
2. Do Mexican children play the same games that we do?
3. What kinds of schools do Mexican children attend?
4. What radio programs do children in Mexico listen to? Do they attend movies?
5. How do Mexican children help each other? Their mothers and fathers?

In preparing for a unit on transportation, another teacher in the intermediate grades carefully drew several chalkboard sketches of unusual kinds of transportation: a dugout canoe and outrigger, a Japanese rickshaw, a camel, an umiak, and a sampan under full sail. Under these drawings she wrote questions like the following:

1. When did people use this kind of transportation?
2. In what parts of the world are each of these means of transportation used?

On succeeding days other simple line drawings of transportation devices characteristic of other parts of the world in the past and today were used in the same way. The curiosity-arousing blackboard drawings drew endless questions from the children and led quite naturally to discussions of how the answers to these questions could be found. In this way a unit of study was begun.

Demonstration uses of the blackboard offer the teacher the opportunity of accompanying verbal explanations with simple sketches or line drawings of processes, things, or ideas diagrammatically expressed so that the visualization can accompany the verbalism. The geometry teacher who is explaining the Pythagorean theorem would be quite helpless without the simple line relationships which visualize thinking and developmental explanation.

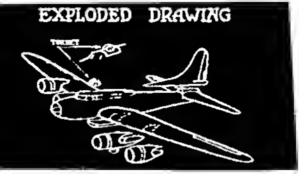


Fig 3.13. The chalkboard is used to visualize vocabulary. Exploded drawings dramatize details.

The social studies teacher who uses group planning techniques in working out an approach to the study of a foreign country uses the chalkboard with great effectiveness as he catalogues the interest the children evince in the new country. In this situation the chalkboard is a going record of progress and of the evolutionary thinking done by the students.

The uses to which chalkboard techniques may be put as a means of illustrating, supplementing, clarifying, and outlining classroom procedures are as varied as the subject-matter responsibilities and grade levels

Fig. 3.14. The chalkboard is used to summarize experiences. Its use with charts and models heightens interest.

of the modern school. At one extreme may be the visualization that tells a complete story and may become the core activity around which an entire discussion may revolve. The exploded drawing (Fig. 3.13) which shows the piece-by-piece structure of a modern aircraft may become the focal point of attention as the junior-high-school teacher explains the structural functions and parts and relates each to the specific vocabulary the students will learn from the discussion.

The chalkboard may be used in relation to other teaching materials such as models, experience charts, aod flash cards, all of which ultimately create relationships and understandings of the symbols and of the objects for which these symbols stand (Fig. 3.14). Through this type of interrelated use of the chalkboard, the primary teacher effectively encourages reading comprehension.

The chalkboard can become an accessible medium for tabulating com-

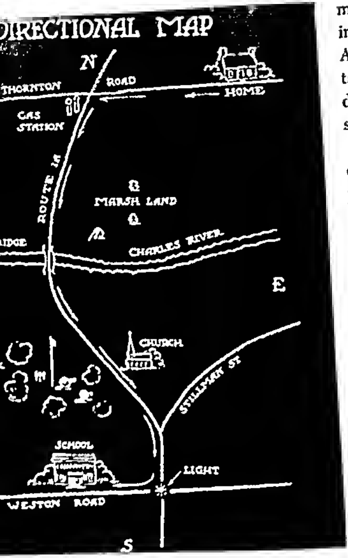


Fig. 3.15 The chalkboard is used to begin map understandings.

munity geographical features in symbolic form (Fig. 3.15). Another interesting use is for tabulating temperature range during a calendar period, as shown in Fig. 3.16.

Some advantages of using a chalkboard in the learning process are:

1. The chalkboard can become an integral and valuable part of pupil-teacher planning.
2. The chalkboard can be a means of motivation. It can be used for recording the progress and status of pupil-teacher planning.
3. The chalkboard is useful in recording progress by documenting trial-and-error approaches to subject-matter responsibilities.
4. The chalkboard makes possible quick change and rearrangement, both valuable in documenting developmental thinking.
5. The chalkboard may become the medium through which group projects are worked out. Group projects in the social studies, art, arithmetic, nature study, history, and in other subjects can be planned, illustrated, and summarized by means of chalkboard techniques.

EVALUATION

Since the orderly use of the chalkboard must at some time be evaluated in terms of the opportunities it affords for improved teaching, the suggestion is made here that after a chalkboard demonstration, explanation, or assignment, pupils and teachers join in discussing its effectiveness.

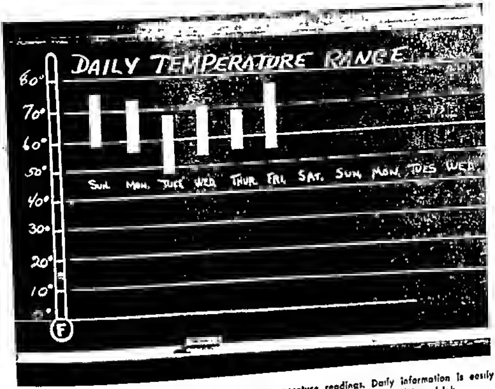


Fig. 3.16. The chalkboard is used to visualize temperature readings. Daily information is easily chalked in. The basic chart and the thermometer are "permanently" drawn with chalkboard ink.

Basically, chalkboard teaching techniques are good or ineffectual in terms of whether or not the use of the chalkboard contributes to higher levels of understanding, interest, and subject-matter accomplishment. For this reason, it is suggested that the following items be used as at least one means of evaluating chalkboard use.

Chalkboard Techniques

1. Did our use of the chalkboard illustration help us in the work we are doing? Yes .... No ....
2. Did the chalkboard information present a learning opportunity which was beyond that available with more accessible, more easily arranged materials? Yes .... No ....
3. Did the whole class (where possible) help in creating the chalkboard display, each in terms of his own interest and ability? Yes .... No ....

Mechanics

1. Was the chalkboard display free of glare? Yes .... No ....
2. Was the chalkboard display uncluttered, pleasing in appearance? Yes .... No ....

3. Was it organized around the focal point of interest? Yes .... No ....
4. Were titles neat, and headings, captions, and phrases meaningful and as brief as possible? Yes .... No ....

SUMMARY

No teacher need say, "I'm interested in visual instruction methods, but my school doesn't give me any money for them."

Any interested teacher can begin a program of improving instruction by becoming a more effective user of chalk and chalkboard.

The chalkboard (blackboard) is one of the oldest graphic or visual instruction devices. The earlier slate blackboard has now been replaced by white, green, or yellow satin-surfaced or glare-proof glass or plastic chalkboard.

Chalkboard materials for writing, drawing, and illustrating should be available to every classroom teacher; these include white and colored chalk, rulers, compasses, templates, patterns, stencils, etc.

Although many teachers feel that they have to be gifted artistically to use chalkboard visualization, this is *not* the case. The teacher-artist has a natural advantage, but there are many techniques of chalkboard teaching which can be easily learned by any interested teacher. These include:

1. Careful selection of usable chalkboard space, attention to size of letters, use of properly prepared chalk, etc.
2. Use of printing, proper spacing, guide lines, etc., to increase legibility and therefore understandability.
3. Preparation of patterns or templates when outline maps, diagrams, scales, etc., are used repeatedly.
4. Use of the grid method and the opaque projector in transferring useful but hard-to-draw diagrams, charts, pictures, etc.
5. Use of the hidden drawing technique to add flexibility, imagination, and high interest to chalkboard teaching.
6. Mastery of elementary stick figure or cartoon technique for dramatizing and imparting interest to chalkboard teaching.
7. Use of the magnetic chalkboard in creating movable three-dimensional charts, maps, floor plans, layouts, etc.

The chalkboard is a universally "available" teaching device. With reasonable study and practice anyone can learn to use it effectively.

Suggested Activities

1. Page through professional education magazines and locate names and addresses of chalkboard manufacturers and suppliers. Write to them for current information about chalkboard surface material, chalk, templates, compasses, rulers, etc. Prepare this information as a "source" list for future reference. (Also consult the Source Lists on pages 541–542.)
2. As you observe your critic teacher, fellow practice teachers, or colleagues in their teaching assignments, list the possibilities you find for the improvement of study situations through chalkboard use. Under the heading "Chalk Talk Opportunities" enter notations of how diagrams, instructions, special illustrative explanations, etc., might have helped to answer pupil questions or have been "short-cut" and "time-saving" devices.
3. As you prepare lesson plans, sketch in chalkboard teaching ideas. Report on the success of these diagrams, graphs, or other pictorial explanatory devices after you have tried them out in teaching situations.
4. Demonstrate how to select and prepare a chalkboard panel for use in the classroom in which you meet to study visual instruction. Demonstrate your ability to handle problems of glare, size of lettering, care of chalkboard surface, erasing, freehand line and circle drawing, etc.
5. Show your ability to heighten interest in chalkboard illustration through your use of stick or cartoon figures.
6. Make a chalkboard ruler, compass, pattern, and template. Show how you will use them in connection with the subject you teach or will probably teach.
7. Using suitable graphic subject material, enlarge and transfer a small drawing or picture to a chalkboard by means of the grid method and the projection method.
8. Discuss the problem of visibility. Include seating, angle, light sources, printing size, use of chalk, correct width and sharpness of chalk.
9. Discuss the use of color in chalkboard illustrations related to your special subject interest or responsibility.
10. Arrange to view the film, *Chalkboard Utilization*, Sound, B&W, 16 min., Young America. Discuss ways you can adapt to your own teaching use the various techniques and ideas in this film.

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As she came into her room after recess, Miss Brewster noticed several youngsters engrossed in a display of pictures she had just put on a bulletin board (Figs. 4.1, 4.2).

"Gee," she overheard one saying, "look at the Diesel locomotive. Boy, that's really something."

Another said, "Yeah—and look at this big freight engine—I bet that's the biggest engine in the world."

"Nah," said a third boy with a knowing air, "that's not the biggest. I saw the biggest one out west last summer. It's a Union Pacific 4-8-8-4. I got a picture of it at home."

"Would you like to bring that picture, John?" asked Miss Brewster. joining the group.

"Sure," said John, "and I've got a lot of others, too—the Super Chief, the GM Aerotrain, and lots of old-time trains." By that time other children had gathered around and a high degree of interest was evident. A few well-chosen pictures were getting the unit on modern transportation off to a flying start. . . .

In another classroom a group of junior-high-school pupils were discussing the subject of advertising. The teacher placed one of a series of colorful soap advertisements in the opaque projector and the students
ently.

you noticed about each of these ads?" asked Mr. Johnson.
ave a good-looking girl in them," volunteered Joe.
itself the best or kindest to your skin," added Mary.
l kind of attractive," said another boy.
use words like 'best,' 'most suds,' 'creamy,' 'soft,' 'fluffy,' 'snowy,' 'pure,'" added a fourth pupil.

"It looks as if everyone tries to find the best picture they can think up so as to attract attention to their ad, and all use the same kind of descrip-

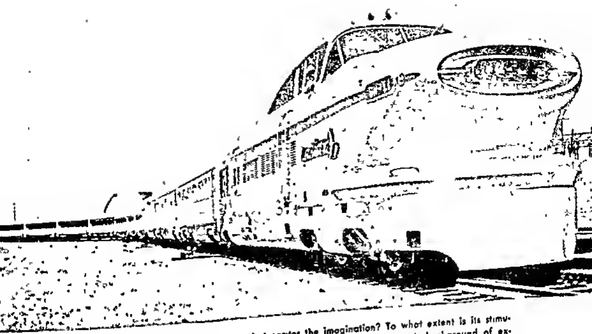

Fig 4.1. What is there about this picture that excites the imagination? To what extent is its stimulating quality a part of the picture itself and to what extent is it in the viewer's background of experience?

tive words. It makes you wonder how can all be best—are they telling the truth?" summed up another lad.

Thus ideas, leads, questions, suggestions for further activity, high group interest, a challenge to creative thinking—all were stimulated by the addition of a few pictures to a learning experience.

With the coming of spring, a primary reading class eagerly followed Miss Barstow's story about birds migrating back from the southland. The pupils participated enthusiastically in planning a field trip to a nearby park in order to *see* some of the spring birds they had been reading about. As an additional stimulus Miss Barstow showed a film about robins and used a number of good pictures brought in by the pupils. As free "reading" she had several sets of colored stereographs showing many birds in their natural surroundings and in striking three-dimensional realism. "Robins," "bluebirds," "blackbirds," "swallows," "wrens"—these names came to have vivid meaning as pictures, stereographs, and first-hand seeing gave the words meaning in terms of the child's experiences.

FLAT PICTURES—A UNIVERSAL LANGUAGE

The flat picture is an old familiar friend. On every side pupils and teachers alike are constantly exposed to pictures—pictures in newspapers,

Fig. 4.2. This illustration is intended to convey a feeling of great power. Does it do this successfully? If so, what elements produce this effect?

magazines, books, comics, billboards, cartoons, posters, even on postage stamps.

Taking pictures has become a common hobby among young and old alike. No vacation is complete without at least a few photographs of the locale and of memorable scenes, events, and people. Pictures capture slices of reality—and tell a story in a language all their own.

During recent years the picture medium has been used extensively in national magazines devoted largely to pictures as a means of presenting information and ideas. Practical experience and experimentation have enabled these publications to lead the way in finding a combination of pictures and words which is markedly superior to either words or pictures alone. In this development pictures have assumed a major role, rather than their formerly incidental one—an important forward step in communication.

Textbook publishers have likewise greatly increased the number and

quality of illustrations in their books. Research has established that pertinent illustrations add interest and comprehension. Halbert, for example, found that children "get more relevant ideas from reading a story with pictures than from reading a story alone or from the pictures alone."[1]

There is no question of the importance of pictures in the effective communication of ideas. This is not to say, however, that just *any* picture will do. Let us examine some characteristics of flat pictures and then consider how to select good ones for teaching.

Fig. 4.3 Is this a good picture for use in teaching? As you look at it, what impression do you receive? What is the picture trying to say? Does it say this effectively? Does it convey accurate, clear impressions or is there some confusion? Does it please you? Why? Now look at Fig. 4.4 and ask the same questions. How do the two pictures compare in your judgment?

COMMUNICATION CHARACTERISTICS OF FLAT PICTURES

Just as a composer must know the kinds of effects which can be achieved with various combinations of musical instruments, so must the teacher know which teaching tools can best achieve desired results in specific learning situations. In the case of audio-visual materials, this involves knowledge of the inherent characteristics, the advantages and limitations of each of the various media available to him. Thus we need first to consider flat pictures as a medium before taking up the matter of individual picture selection.

Flat pictures are two-dimensional. It would appear unnecessary to point out that flat pictures are "flat." Yet from the learning standpoint this is a characteristic of more than incidental importance, particularly with young learners or with complex

[1] Marie G. Halbert, "An Experimental Study of Children's Understanding of Instructional Materials," *University of Kentucky Bulletin of the Bureau of School Service*, June, 1943, p. 44.

subject matter. A flat picture of a subject in which depth is important to understanding must have good third-dimensional quality to be suitable for teaching purposes. Artists and skilled photographers have ways of building an illusion of depth into their pictures by such means as using perspective lines, reducing the size of background objects, shading down the brilliance or contrast of background colors, and using light and shadows which bring out the three-dimensional character of the scene. (See Fig. 4.4.) Examine the pictures in this chapter and pick out those which seem to fulfill this requirement best.


Ewing Galloway

Fig 4.4. Would this be a good picture to use in teaching? In what ways besides subject does it differ from that in Fig. 4.3?

For scenes with which the observer has some familiarity—to which he brings a sufficient degree of experience—the above techniques provide the cues that enable him to sense rather accurately the depth actually in the scene being pictured. When scenes contain few familiar elements, however, the accuracy of one's depth impressions may be considerably reduced. Thus the vastness of the Grand Canyon is extremely difficult to grasp from a picture until you have seen the canyon yourself. Similarly, youngsters who have never seen mountains or skyscrapers will have difficulty in sensing their true dimensions from flat pictures.

The opposite extreme, in which little depth actually exists, presents even more of a problem to the photographer and to the learner. A cutaway picture of a closely packed gear assembly such as a transmission (Fig. 4.5) is apt to be of little help to most persons in comprehending it. But when the transmission is taken apart and spread out into several sections, each of which is pictured separately, it is easier to understand. In recent years medical schools have made extensive use of stereo pic-

tures to provide their students with a more effective third-dimension visualization of the details of operations and of man's internal anatomy.

Flat pictures are a "still" medium. The term "still pictures" is frequently used to describe flat pictures. This use is inaccurate in that it fails to distinguish between projected and nonprojected pictures or between

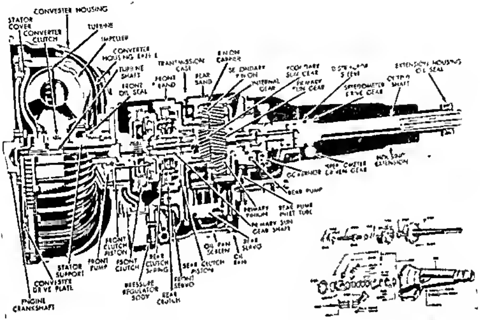

Fig. 4.5. This cutaway of an automatic transmission gives one kind of information; the smaller photograph of part of the same transmission gives another kind. For what different purposes could each be used?

opaque pictures and transparencies. On the other hand, it does suggest one characteristic of flat pictures, namely, that they are motionless.

One of the more suitable applications of flat pictures is accordingly the still scene, like that shown at the beginning of this chapter. Such scenes as landscapes, mountains, forests or trees, buildings, objects, animals or people in a still position are natural subjects for flat pictures. An important phase of both art and photography deals with "still life."

Flat pictures can suggest motion. A street scene in a flat picture may show several types of activity very effectively. People are walking, cars are passing, branches are swaying in the breeze and you have no diffi-

Fig. 4.6. What is the center of interest in this picture? What elements lead the eye directly to it? Is motion evident? What motion cues do you find?

culty in sensing the motion which is present in the scene. This is due partly to experience and partly to techniques employed in the picture itself.

Being familiar with similar street scenes, you know that automobiles in motion are a typical part of such a scene and your mind supplies the motion accordingly. Similarly you know that the people on the sidewalk are going somewhere and hence you supply motion to them also.

There are, in addition, numerous cues in such a picture that suggest motion. People's arms are in a swinging position and their feet are shown in several stages of taking a step. A flag is extended and a man is holding the brim of his hat, so you know a breeze is blowing. Numerous devices of this nature suggest motion. Some, such as the stroboscopic pictures of

a track event, are obvious. Others are subtle. As you look at the pictures in this chapter, note the means employed to convey the idea of movement.

Flat pictures emphasize key ideas and impressions. Elsewhere in this chapter, in considering the evaluation and selection of flat pictures, we say that a good picture presents one principal idea. There is a well-defined center of interest and the whole scene contributes to what the picture has to say (Fig. 4.6). A kaleidoscopic shot of the beach at Coney Island conveys one impression; a shot of a single bather or a small group conveys an entirely different impression. In either case there is an idea around which the picture is built. This emphasis on a key idea or impression greatly enhances the value of flat pictures in instruction.

Flat pictures lend themselves to detailed individual study. The flat picture has several other advantages. It provides opportunity for careful, detailed analysis at the learner's own rate and interest level. He can examine it as often and as long as he wishes. The presentation of extensive detail is likewise possible in a still picture. One of the chief uses of the 200-inch telescope on Mount Palomar is to secure hundreds of still photographs of the heavens so that astronomers in any part of the world may study them at their convenience (Fig. 4.7). A series of illustrations showing how to tear down and reassemble a motion-picture projector is similarly of great value to a service man because of the infinite detail such pictures can supply.

Flat pictures cover a wide range of subjects. One of the most familiar characteristics of flat pictures is their versatility. Practically anything that can be photographed or represented pictorially can be shown on flat pictures. This range of subject matter, from concrete objects to abstract ideas, constitutes one of the chief advantages of flat pictures in instruction. The great number of pictures available at little or no cost is another distinct advantage. This rich variety and abundance of pictures presents certain problems as well, namely, selection and storage.

SOME CRITERIA FOR SELECTION

Having determined that flat pictures are appropriate to the teaching job he is to do, the teacher will next need to judge the relative merits of available pictures and select those best suited to his specific purposes. From this standpoint both educational and artistic considerations are

Fig. 4.7. A nebula spotted by a smaller telescope is photographed by the "Big Eye" on Mount Palomar (opposite page).

important. The following five criteria are suggested as a practical guide in selecting pictures for classroom use: suitability for teaching purposes, artistic quality, clarity and size, validity, and interest.

SUITABILITY TO TEACHING PURPOSES

An attractive, stimulating, and otherwise acceptable picture will be of little use in a lesson unless it adds something valuable to the learning situation. In other words, a picture must "hit the nail on the head"—must convey an idea, a segment of information, or a concept that is exactly suited to the teaching need. An essential step in selecting *any* instructional material is determining the degree to which it meets the learner's needs. This requires little explanation, but is extremely important.

Suppose, for example, that Miss Brewster is selecting pictures for a lesson on animals. One of her general objectives is to develop an understanding of how to care for pets; another, to build attitudes on conservation with respect to wildlife in general; a third, to bring out how animals are adapted to their environment. For this particular lesson, however, she has a specific objective in mind—the identification of several birds which will soon be coming north. She comes across a picture of a cat crouching under a tree; a robin has just alighted on a limb of the tree. The picture has a feeling of tense drama, it is extremely realistic and vivid, the colors are excellent, it is artistically good, and it is sufficiently large for the study of detail—in short, it is a fine picture. The only thing wrong is that it won't help much in identifying a robin.

The whole impact of this picture on the child's mind will concern whether or not the cat is going to get the bird. Hence Miss Brewster shrewdly passes it by, making a mental note to use it several days later in a lesson on how to protect our feathered friends.

She chooses, instead, a close-up shot of a robin in a characteristic pose

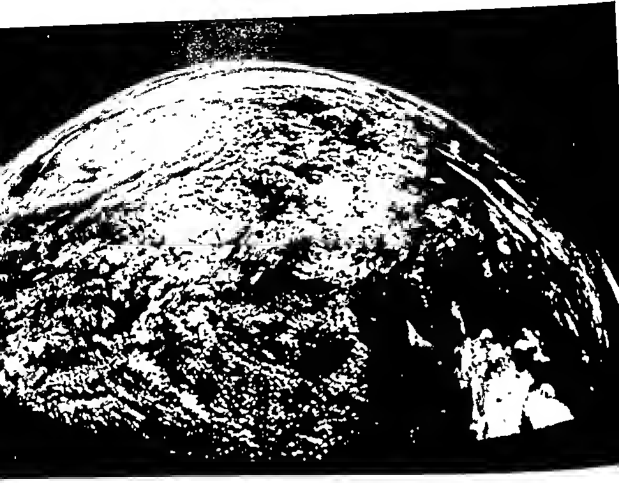

Fig. 4.8. A new look at a hurricane from a Navy rocket 100 miles up. The hurricane is 1000 miles in diameter, and the camera horizon extends about 2800 miles, from Omaha, Nebraska, at the left, to the Gulf of Lower California (Mexico) at the right. Parts of nine states and the whole of Texas are shown. This is believed to be the largest earth area ever photographed from one spot at one time. What teaching values are offered by a photograph like this?

on the lawn after a rain, its head slightly bent as if listening for worms, and its colors highlighted in the afternoon sun. The first picture is undeniably more fascinating and will get the children's attention, but it will not meet the objectives of that particular lesson as well as the less dramatic picture.

A further consideration in the selection of pictures to fit a specific teaching purpose is *grade level.* Although in most cases this is not a difficult problem, it is well to remember that the determination of what is to be accomplished in a lesson should not be separated from the question "For whom?" This question does not constitute as serious a problem in most instances as it does in the selection of reading materials. Nevertheless, there must be fewer elements in a picture for young children

than for pupils in higher grades, the pattern must be simpler, the idea less complicated.

This is, of course, quite natural because in terms of his experience the primary child can bring less to a picture than can his older brother and sister. To him a picture of an airplane is usually just an airplane, though he has probably learned to distinguish in his own mind between big planes and little ones. His ten-year-old brother, however, will very likely be able to identify the plane as a jet or a turbo-prop transport and will volunteer information as to its size, speed, and the altitude at which it flies.

Evidence showing the importance of selecting pictures suited to age level is reported by French. Using both a complex and a simple, literal version of thirteen pictures, he tested the preferences of 88 elementary-school teachers and 554 pupils in Grades 1 through 5. He found that while 89 percent of the teachers preferred the complex versions, 83 percent of the first-graders preferred the simple illustrations. Not until Grade 4 did a majority of the children prefer the complex pictures. Thus French concluded that children show "a logical and consistent basis for their selections" and that they "preferred pictures that were understandable on the basis of their own artistic experience."[2]

While much remains to be discovered about how we learn from pictures, we know that variations in picture reading ability are due to a combination of factors of which age is only one. Intelligence, environment, prior experience in reading pictures, and imagination all probably play a significant part. Thus it is important for a teacher to consider his pupils' abilities, age, and probable experience when choosing pictures for classroom use. In the primary grades he may need to discount his own picture preferences. At any level he will need to determine when a picture has the necessary concepts for his purpose, plus the right amount of detail, the appropriate degree of abstraction, and the other qualities that make it suited to the abilities and interests of his students.

ARTISTIC QUALITY

Basically, artistic quality asks simply, "Is the picture effective in terms of the artist's purpose?" An artist may analyze a picture in such terms as

[2] John E. French, "Children's Preferences for Pictures of Varied Complexity of Pictorial Pattern," *Elementary School Journal*, October, 1952, pp. 90–95.

proportion, perspective, balance, and unity; but a teacher does not have to be trained in art to know whether or not a picture creates the desired effect. This effect may be pleasing or otherwise. A good picture of a slum area, for example, may emphasize the filth, squalor, and misery of life in crowded, unsanitary surroundings. It may be anything but pretty to look at and still be a good picture. Likewise, scenes such as that in Fig. 4.9 are effective even though they deal with subjects unrelated to attractiveness of appearance. It is true that all pictures do not seem equally effective to different people, but certain characteristics may be expected to be present in teaching pictures that are generally regarded as artistically acceptable.

Fig. 4.9. One would not ordinarily expect the interior of a boiler to provide good picture opportunities, yet this effective picture was taken there. What factors make it effective?

Good Composition

The fundamental characteristic of an effective picture is good composition, or good overall organization, such as is shown in Fig. 4.9. Usually an effective picture has a clear-cut center of interest to which the rest of the picture contributes by such means as the balance of the picture as a whole, the position and direction of lines, and the use of light, shadow, and color. The focus of interest is rarely in the center of the picture, a position other than the center being more pleasing to the eye, as a rule. The presence or absence of a good center of interest can be readily ascer-

Opposite page: Too few people have seen the true beauty of this United Nations Trusteeship Council Chamber in the warmth and richness of full color. This picture took 6½ hours to photograph, time exposures being used on the window view in the late afternoon and on the many banks of lights after dark. The photographer used 240 flash bulbs singly in a 3½-hour series of night shots to bring out the various details in the room.

The several distinct centers of interest in this picture are brought together, by a kind of unity, into a pleasing total effect.

tained by allowing the eye to travel until it fixes on a point of key interest. Look away from that point and see whether or not your eyes tend to go back to it.

Occasionally pictures of huge crowds, of geometric patterns, or of a large number of similar objects do not have a center of interest in the usual sense. In these pictures the overall effect is the objective—a general impression rather than specific detail. Thus 100,000 people in a public square, row upon row of dilapidated houses, or rolling fields of grain extending as far as the eye can see may have a powerful effect on the observer.

The center of interest in such pictures is an idea rather than a physical thing. Their effectiveness is determined by how well this idea is communicated. A mass subject is difficult to photograph effectively for the reason that it does not have a visible center of interest around which composition can be built.

Effective Color

The use of harmonious and effective color is a second mark of good art. Colored pictures selected for use with children should generally be true and natural in color. Color values in nature are seldom primary reds, blues, greens, and violets; rather they are composed of infinite variations of these colors. Hence, where color is important in a teaching situation it should be as true as possible. (See the accompanying two plates.)

An exception to the above statements must be recognized with respect to art subjects in which color is used as a dominant means of expressing ideas. Thus children pay little attention to natural colors in expressing themselves in paint or crayons. Trees may be purple splashes, a locomotive a racing giant in flaming red, yet the pictures are highly meaningful to the young artists.

Likewise in observing such pictures, if they are good pictures children seem to experience little difficulty in grasping the artist's idea. For an art class or any other class in which unique or unusual illustrations bring out a particular point well, "impressionistic" pictures of

Opposite page: Besides strong aesthetic appeal, what does color add to this striking view of the Matterhorn? How does it contribute, for example, to an understanding of the landscape and its vegetation? To comprehension of life and the problems of living on a Swiss mountainside?

this type may be entirely suitable. The decision as to whether or not to use abnormal colors must, of course, be based on the specific purposes of the lesson. Informational concepts are normally conveyed most effectively by accurate color renditions.

Color is a part of our natural environment. Hence good color in pictures adds realism as well as attractiveness to a pictured scene. Illustrations of particularly effective color use are found in the plates facing pages 84 and 85. As color film is improved and as color reproduction processes become more flexible and less expensive, pictures of this quality will be used with increasing frequency in text and reference books of all kinds. The better-illustrated magazines, advertising brochures, and trade journals are already making extensive use of full-range color reproductions.

It should also be noted that black-and-white photography can provide a wide variety of color impressions. Study of the gray scale (a scale of uncolored shades from black to white) suggests the many subtle variations in value that are possible with black-and-white film (see Fig. 4.10). Because of its greater flexibility, many photographers prefer working with black-and-white film whenever color is not an essential element of the picture. For the same reason, it is often well for the teacher to select good black-and-white photographs rather than mediocre colored pictures, particularly when color is only incidental to the subject being taught.

Technique

A third characteristic of good pictures is the technique of the artist or photographer. More so than is true of composition and color, technique may be and frequently is a highly individual matter. A person with only a casual artistic acquaintance has little difficulty in recognizing the distinctive quality of a painting by Van Gogh or Rembrandt. Likewise, a student of photography soon learns the unique characteristics of the work of outstanding photographers. The important point in selecting pictures for classroom use is simply that whatever the technique employed, it should be effective and of high quality.

CLARITY AND SIZE

Clarity and sharpness constitute another major consideration in the selection of pictures for school use. Although softness of focus is effec-

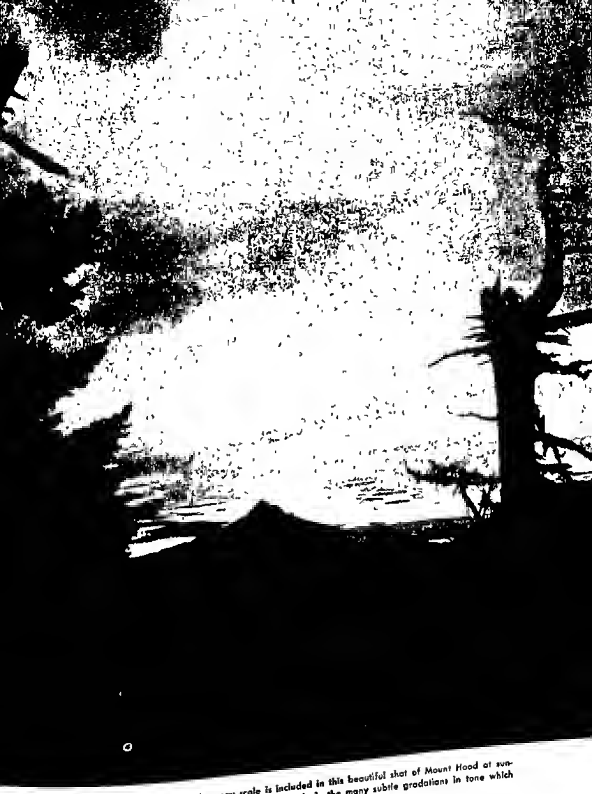

Fig. 4.10. The full range of the gray scale is included in this beautiful shot of Mount Hood at sunrise. Can you see an advantage for some kinds of study in the many subtle gradations in tone which are possible with black and white pictures?

tive in portrait work and for the portrayal of certain moods, most educational subjects are better illustrated by pictures which are clear and sharp. The sharp picture with strong contrast provides better opportunity for accuracy and detail—a better representation of reality—and thus is preferable when information is the primary objective in picture use.

In addition to photographic quality, another important consideration is whether the picture is large enough to be seen readily. The best picture is ineffective if it cannot be seen well by all the students. An opaque projector will enlarge small prints so that the whole class can see them. But when seeing becomes difficult, comprehension and interest are handicapped and attention soon wanders. You can easily demonstrate the importance of size by noting which pictures on the wall of a friend's living room you can recall most readily. Although several important elements other than size are involved here, the pictures that are noticed and remembered most are usually the larger ones.

VALIDITY

The effectiveness of a good picture makes it a powerful teaching tool. It is important that the impressions left in a child's mind be correct and accurate, insofar as the picture can make them so. This means that the photograph, painting, or illustration must provide both a true general impression and accuracy of detail. To accomplish this, the picture in most instances should be typical like that in Fig. 4.11, rather than unique or startling. The unfortunate fact that the unusual scene frequently lends itself to picture making more readily than the ordinary run of events should make the teacher pause and think when considering the factor of truthfulness.

The dramatic, thrilling, or unusually beautiful scene may have its place in the schoolroom for decorative or motivation purposes, but you convey accurate impressions primarily by pictures that are more representative of the area or subject being studied. Thus if for story purposes we wish to show the Hollander of another day with quaint wooden shoes and pantaloons, let our social studies classes see him as he is today on his modern farm or busy city streets, with occupations, interests, and appearance much like those of other western Europeans.

Fig. 4.11. Does the familiarity of this scene make it more or less useful in teaching children to wait at intersections for traffic to stop?

INTEREST

It may appear somewhat inconsistent to maintain that a picture should be typical rather than unusual and at the same time that it must be highly interesting. Yet interest among children tends to be attracted by a vast number of ordinary things with which they are familiar. For instance, consider the great interest usually shown by children in pictures of animals or other children, or of trains, ships, or airplanes; a good example of this type of picture is shown in Fig 4.12. To each of these the child brings some degree of familiarity which helps to arouse his curiosity and to give an outlet to his imagination. Thus, pictures which are real and vivid, which have a good center of interest, and which deal with subjects containing elements already familiar to the student, are inherently interesting and stimulating.

MOUNTING AND STORING PICTURES

Having selected suitable pictures, the teacher will wish to present them as effectively as possible. Their placement on the display board or chalkboard and direct presentation by the teacher are both good; but

whatever method is used, they must be made to appear to their best advantage. This usually means that flat pictures should be mounted. "A picture worth using is worth mounting" is a statement worth remembering, for psychologically it is both sound and practical.

Effective picture mountings can be done by any teacher. All that is necessary is imagination, a few inexpensive materials, and the application of one or two principles of good display.

Fig. 4.12. A child and a pet have universal appeal for adults. Would children also find this picture appealing?

PRINCIPLES OF EFFECTIVE MOUNTING

1. *Use generous margins.* Generous margins are not solely a matter of artistic taste but embody the direct application of the principles of attracting and holding attention. Any object tends to attract more attention when by itself than when crowded in among a number of other similar objects. Moreover, an appropriate mounting makes a good teaching picture more attractive just as an appropriate frame enhances a photographic portrait or a painting. In addition, the mounting protects the picture in handling and makes it easier to file.

Correct proportions for mounting pictures of various shapes are shown in Fig. 4.13. Note the width of the margins used. The width of the top and bottom margins is determined by the shape of the picture, as Fig. 4.13 shows. Note also that the bottom margin is *always* wider than the top margin.

2. *Use colors which direct attention to the picture and not to the mounting.* This means that as a rule it is best to select for the mounting a color that appears in the picture in a relatively minor degree. This repetition of color creates a pleasing harmony in the total effect given by the mounting and picture together. It is usually not wise to use a

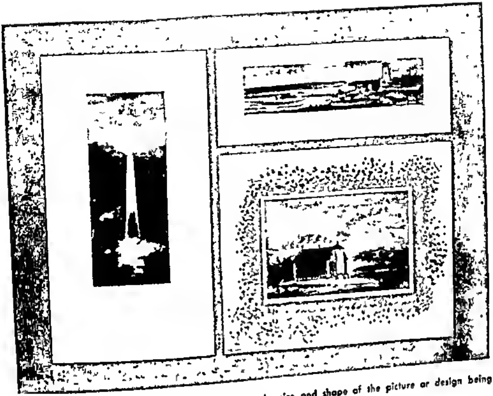

Fig. 4 13. The width of margin depends upon the size and shape of the picture or design being mounted.

predominating color in the picture for the mounting because of the resulting loss of desirable contrast. A picture of a field of ripe grain will not appear to the best advantage on a yellow mounting, nor will a picture with a broad expanse of blue sky look well on a light blue mounting. In such cases the picture loses definition because, from a short distance away, it tends to merge with the mounting itself. When in doubt as to the precise color to use, the teacher will do well to experiment until he gets a satisfying effect.

In general, neutral tones for mountings are more pleasing than "loud" or brilliant colors, although there are notable exceptions. Thus bright red or green mountings look well with Christmas pictures, orange mountings with Halloween subjects, and gay pastel mountings with Easter decorations. The idea here is to emphasize a gay and festive spirit; the purpose of these mountings may be primarily decorative, which is entirely appropriate in such cases. As a general rule, however, where informational purposes predominate, the above principles should apply.

Often a narrow border will help to set off the picture from the mounting. Sometimes an inked line around the picture is effective. A similar border effect is obtained by inserting, immediately behind the picture, a sheet of mounting paper slightly larger than the picture and of a different color from that used for the mounting itself. Since this sheet extends slightly beyond the edges of the picture, it provides a border in a contrasting color. White used for a border of this kind is often highly effective because it brings out the color in the picture.

3. *Use mounting materials appropriate to the picture subject.* Teachers frequently find colored drawing paper to be the most readily available material for picture mountings; it is also inexpensive. But once the teacher gets the feel and pleasure of attractive mountings, there is no reason why he should not give his ingenuity free play and experiment with a variety of textures, materials, and colors in obtaining desired effects. A shop teacher, for example, may find a metallic background ideal for a series of metalworking pictures; a background of old maps may be very effective for a series of historical illustrations; fabrics of various kinds or pieces of wallpaper make appropriate and interesting mounting materials for pictures on interior decoration. The possibilities are virtually without limit except as to the time, interest, and enthusiasm of the teacher himself.

TECHNIQUES OF MOUNTING

A variety of techniques for mounting pictures on selected backgrounds are available to the teacher. There are dry mountings, floating mounts, temporary mountings with thumbtacks, etc., and such special mounts as acetate envelopes and transparent plastic gummed sheets which protect the picture surfaces.[3] For permanent mountings a fairly stiff backing material, such as Bristol board or heavy cardboard, is desirable. Such material does not deteriorate readily and provides a firm backing for a flat picture which is to be used again and again.

Temporary Mountings

RUBBER CEMENT. One of the simplest methods of mounting is to coat the back of a picture with rubber cement and lay it on the mounting

[3] See pp. 542–543 for sources of mounting and display materials for flat pictures.

surface. Rubber cement comes in convenient tubes or jars, is not messy, and has the added virtue of being readily removable. Should some of the cement squeeze out around the edges when a picture is pressed down on the mounting surface, the excess can be rubbed off with the fingers. The cement does not dry completely for a long period of time nor does it tend to soak into the paper surface. This means that a picture can be peeled off of a mounting whenever desired. A more permanent mount is obtained by coating both the picture and the mounting and allowing the two surfaces to "set" for a minute or two before putting them together.

Rubber cement can also be applied along the edges of the back of the picture; it will hold very well if the picture is not on heavy stock which will tend to curl. Dabbing on liquid paste or glue at the corners is a well-known method of "pasting" pictures. This can also be done satisfactorily with rubber cement if the picture is on magazine or lighter-weight paper stock.

OTHER ADHESIVES. Various gummed tapes are of some value in mounting flat pictures. The best of these is a double-surface masking tape. Strips of this tape are placed on the back of a picture, which is then pressed on the mounting surface. This tape can also be used for displaying mounted pictures on bulletin boards and other surfaces.

A synthetic waxlike adhesive is likewise used for mounting, particularly for displaying mounted pictures on virtually any type of surface. Small bits of the wax are sufficient to hold the mounted picture in place for as long as desired.

PINS AND THUMBTACKS. The bulletin board display that is studded with shiny-headed thumbtacks is all too familiar. Although thumbtacks are used in mounting pictures, the resulting appearance is generally poor. A much better effect is obtained by using straight pins, as many art teachers do; the pins cannot be noticed more than a few feet away. Pins are particularly useful when time does not permit the use of better methods.

Permanent Mountings

FLOATING. In floating, the entire back of the picture is coated evenly with a layer of paste, glue, or liquid cement. The picture is then placed on the mounting and carefully smoothed down. Pictures so mounted should be put in a press or under a pile of books until they are dry in

order to assure a good bond at every point and to minimize curling. Only enough adhesive should be used to coat the picture very lightly because any excess around the edges is difficult to remove without impairing the appearance.

DRY MOUNTING. Dry mounting requires a special tissue material that is affixed by means of a hot iron. A neat, professional-looking mounting job can be done with a little practice.

The dry-mount tissue can be obtained in rolls or sheets from photographic supply stores. Kraft board or some other type of cardboard is very satisfactory for the mounting. The other materials required are plain white paper, clear flat lacquer and thinner, and a sprayer like that used for insecticides or paint.

In using the dry-mounting process, a piece of the dry-mount tissue is trimmed to picture size and put on the back of the picture. The picture and the tissue backing are then placed on the mounting material and covered with a piece of plain white paper. An iron heated to about 300 degrees is applied firmly, the picture being literally ironed onto the mounting. The mounted picture is then sprayed with clear flat lacquer to protect it.[4]

PLASTIC MOUNTING. A commercial type of mounting which seals the picture in a clear, nonglossy plastic covering has marked advantages. The picture is permanently protected from dirt, moisture, and tearing. The plastic material is flexible, light in weight, and sufficiently strong to prevent damage from continuous handling.

The use of a plastic mounting process makes feasible the circulation of sets of pictures from school to school within a system. The audio-visual department of the Los Angeles City Schools, for example, has plastic mounting equipment for this purpose. Not all pictures need a permanent mounting of this nature, but it is well suited for those that are to be circulated or are irreplaceable.

The above methods are the ones most commonly used for mounting pictures. In determining which method to use, the teacher should select the one that is most practical in terms of time, effort, and utility. Pictures should be mounted if they are to have maximum effectiveness as

[4] For a good description of the dry-mount process, see Elizabeth Goudy Noel and Paul J. Leonard, *Foundations for Teacher Education in Audio-Visual Instruction*, American Council on Education, Washington, 1947, pp. 33–34.

teaching tools. A few well-selected and well-mounted pictures can provide rich sources of information in an attractive and interesting form.

FILING AND STORING PICTURES

Teachers who go to some trouble to find and mount good pictures have discovered that the storing and filing of pictures when not in use is important. The following suggestions from teachers may help you to avoid some of the difficulties and frustrations that result from inadequate storage space or lack of a filing system.

Standard Mounting Sizes

A compromise between desirable and practical sizes of mountings or mats is one way to lessen the storage and filing problem. Teachers frequently use two standard sizes of mountings—a small size which will go into a manila folder or a standard letter file, and a larger size which will fit into a drawer or box file. This plan means varying the width of the margins around pictures but is preferable to the alternative of not mounting pictures or of having them misplaced or damaged.

Picture File with Index

The simplest filing system involves grouping pictures according to the teaching units or topics in which they are used. When rather large numbers of pictures are involved, subheadings are helpful. For example, pictures on Greece may be subdivided as follows: Greece—Mountains, Greece—People, Greece—Farming, etc. Tabbed or colored separators should be used, the pictures in each section being listed in pencil on the separator. Other indexing systems include notebook lists, with identification of pictures by numbers or topics for quick location; similar lists in lesson plan folders; and a simple card file, with related groups of pictures listed on each card. The filing and indexing system should be as simple as possible but still flexible enough to accommodate additional pictures or sections.

Good picture collections are built up over the years. As better pictures are found, some of the older, less useful ones should be discarded. This keeps the files from getting filled up with seldom used pictures, and it keeps the indexing system simple. A good filing and indexing system is

like a good budget. It may be a bit difficult at first, but once it is functioning efficiently it works for you.

Storage

Modern classroom facilities include built-in drawers and cabinet space in which various instructional materials and supplies, including flat pictures, can be stored. Standard letter-size filing cabinets are suitable for small mounted pictures, but legal-size files are better because they accommodate material up to 11" x 14" in size.

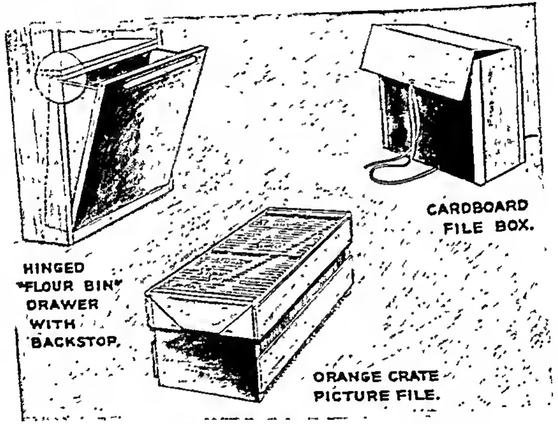

Fig 4.14. Storage of pictures can be a problem. Here are a few suggestions. Dimensions can be adjusted to suit your needs.

Although many classrooms lack filing cases or other built-in storage facilities, ingenious teachers have devised various ways of storing and filing pictures. Orange crates, heavy cardboard cartons, and boxes built to the desired size can serve the purpose satisfactorily and can be kept in out-of-the-way places when not in use.

PRINCIPLES OF THE EFFECTIVE USE OF FLAT PICTURES

1. *Use pictures for specific purposes.* Clear-cut purposes are important in using pictures as well as in selecting them. Having chosen a certain picture to illustrate a particular point, you naturally keep that point clearly in mind as you use the picture with a class. A good picture frequently contains much information, perhaps much more than you wish to discuss. Having specific purposes in mind, you can direct the pupils' attention to the most important items in the lesson.

If today's lesson on colonial life in New England is aimed at giving an understanding of the colonists' food, clothing, and shelter, you direct attention specifically to these items in the pictures you use. If the objective is a comparison of living conditions in the northern, middle, and southern colonies, groups of pictures providing these comparisons should be utilized. In one instance you may point out the comparisons yourself; in another you may let your pupils discover them (Fig. 4.15). In either case you need to know clearly what you wish to accomplish. In other words, the objectives determine both which pictures you use and how you use them.

2. *Integrate pictures in the lesson.* Effective use of pictures in teaching requires that they be treated as integral parts of the lesson. Generally speaking, if pictures are to be used at all, something definite must be done with them. A purely casual reference to a picture implies to the pupil that it is of minor importance. Brief or limited reference to a bulletin board display gives a similar impression. For pictures to be of real worth in a lesson, they must contribute to the pupils' understanding and be used in such a way as to indicate their importance.

3. *Use few rather than many pictures.* A third principle in the effective utilization of pictures is that they be used sparingly. A few well-selected pictures usually accomplish far more than twice as many carelessly chosen pictures do. All too frequently the bulletin board is so filled with materials that nothing stands out. It is unwise to assume that if one picture is good, two will be twice as good. The result may be so many illustrations that pupils are confronted with a mass of interesting but unorganized visual impressions.

The principle here simply involves focusing attention on key ideas. Once these ideas have been well established, additional illustrations may

Fig. 4.15. Large pictures may be used to stimulate class discussion as shown here, but they must be large enough to be seen by all.

be valuable for enlarging on the initial concepts. A picture of a turret lathe may be excellent for familiarizing the shop student with its important parts and levers. The instructor will then wish to expand these initial concepts by means of a series of pictures showing the step-by-step process of setting up a job. As a good shop teacher he will focus his students' attention by showing one picture in the series at a time. Later he may put the entire series where the students can consult it.

TECHNIQUES OF USING FLAT PICTURES

STUDY DISPLAYS

The study display board, familiarly known as the bulletin board, is a highly effective medium for the display of flat pictures. Study displays

have a wide range of applications in virtually all subjects and grade levels. Elementary-school teachers have long made good use of display boards. More recently instructors in secondary schools, industrial training programs, and colleges have begun to make effective use of study displays. Because the study display is of such wide interest and significance, we shall discuss it separately in Chapter 6.

OPAQUE PROJECTION

Few pictures lend themselves readily to direct observation by an entire class at one time because of their size. Pictures which cannot be seen easily from the back row can be projected by an opaque projector so that all may see them with ease. (See Fig. 4.16.) Many schools now have opaque projectors which can take illustrations up to 10" x 10" and provide 1000-watt illumination. The increase in size and illumination considerably reduces the major difficulties in using the older type of projectors. Although some darkening of the room is necessary even with the newer projectors, it does not have to be complete. The 10-inch opening permits use of most of the illustrations in magazines and other publications. Pictures can be placed directly on the projection surface either with or without mounting. A suction or down-draft blower keeps the loose material in place and also protects it from the heat. In newer projectors, the projection surface is a continous belt operated by a hand crank.

Fig. 4.16 Small pictures become visible to all when projected in an opaque projector.

When a series of pictures of similar size is to be shown, a convenient method is to mount each one on a piece of light cardboard like that used in Manila folders, fasten the pieces together with cellophane tape, and draw them through the projector. This provides a filmstrip arrangement of flat pictures. The series of pictures may be "accordion"-folded for easy storage when not in use. A picture story drawn by the children on long strips of paper about 10" wide can also be run through the projector.

INDIVIDUAL STUDY

The value of flat pictures in teaching lies not only in their lifelike realism, but also in the possibility for individual study at the learner's own rate and interest level (Fig. 4.17). Suppose, for example, that a series of pictures on life in India has been shown in the opaque pro-

Fig. 4.17. Pictures for individual study should be readily accessible in books and magazines, on the display board, or in a handy file.

jector and then arranged in a bulletin board display for an intermediate-grade social studies class. Once the class has viewed and discussed the pictures, further and more intensive study of these and other pictures by individual pupils may well be made the basis of committee reports and individual projects.

In this way, pictures come to have an integrated place in teaching and learning methods. They are recognized by pupils as sources of information along with books, films, slides, maps, field trips, and other media, each of which is a valuable member of the team of instructional materials.

An important factor in the effective utilization of flat pictures is recognition of what happens when a person looks at a picture. Although too little scientific knowledge is available on the whole process of communication via pictures, Buswell's extensive studies of eye movements have made a significant contribution well worth the attention of teachers who are contemplating pictures as teaching materials. His studies were made with particular reference to fine art, but his conclusions seem to be valid for informational as well as appreciational objectives in picture study. According to him:

> Two general inferences in regard to teaching children may be drawn from study of eye movements. First, the teacher must expect that in studying a new picture the pattern of perception at first will resemble that of a general survey of the picture as a whole. Without some directional teaching, this general survey is likely to be so satisfying to the pupil that he will make no further attempt to study the picture and will be satisfied to say that he has seen that picture. There is little evidence to show that any real taste for art follows this type of superficial looking at pictures.
>
> A second inference to be drawn is that if the child's attention can be centered sufficiently on certain aspects of the picture to induce him to examine those parts in detail, there may result an interest in the picture which will become so compelling that the child will study that picture until he can call it really his own.[5]

There are several implications for teachers in the Buswell study. First, the teacher should not assume that pupils will secure the important information contained in a picture simply by being exposed to it.

Second, the teacher must do more than merely show pictures to a class. He must bring out specific points of importance about each picture, point out things to look for, and make sure that these things are seen and understood. These objectives may be accomplished in class or by assigning specific questions to the pupils.

Third, it is necessary, for successful individual study, to develop in pupils the habit of looking at pictures carefully, so that they will ascertain important facts concerning the content of a picture, as well as the general impression it gives, and an appreciation of the aesthetic impact of the picture as a whole.

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[5] Guy T. Buswell, "Learning to Look at Pictures," *Progressive Education*, October, 1936, p. 422. See also his *How People Look at Pictures*, Univ. of Chicago Press, Chicago, 1935, p. 198.

Fourth, as with other media of communication, there are wide individual variations in ability to read pictures effcetively, even though these differences are not as marked as in the case of the printed word.

STEREOGRAPHS

Another highly effective form in whieh pictures may be looked at by individual pupils is the stereograph, the most vivid and realistic pieture of all. While the stereograph is primarily useful for individual study, its unique characteristics require that it be treated separately in any discussion of picture study.

The stereograph consists of two pietures of the same scene taken from slightly different angles with a camera that has two lenses set about as far apart as a person's eyes. The two pictures are observed separately but simultaneously by the left and right eye through a device called a stereoscope. The visual representation thus made possible has a highly realistic three-dimensional effect. Since the teacher uses pietures to provide reality in teaching and learning, the value of stereo photographs and transpareneies, when the dimension of depth has significance, is difficult to overestimate.

Although the stereograph idea is more than a century old, its modern development and popularity for school use are quite recent. During World War II the United States armed forces introduced an improved and simplified version of the stereoscope that used 16 *mm.* transparencies in both color and black and white for individual study of sueh subjects as gunnery and aircraft recognition. These were so effective that after the war the improved stereos again became popular for use in many sehool systems. Several pairs of transparencies are mounted on a disk which is inserted in a small plastie viewer; the pieture is shifted by pushing a lever (Fig. 4.18). A marked advantage of the newer stereograph is that it can and does utilize color very inexpensively.

Stereographic projection has likewise become feasible in recent years. Although viewers must wear special glasses and projection equipment is relatively expensive, the cost is justified for specialized applications such as are found in medical and technical schools. The realism added by the three-dimensional effect has led the motion-picture industry to try various methods of achieving it, nntably 3-D and various other widescreen modifications. For the school, the stereograph and stereoscope

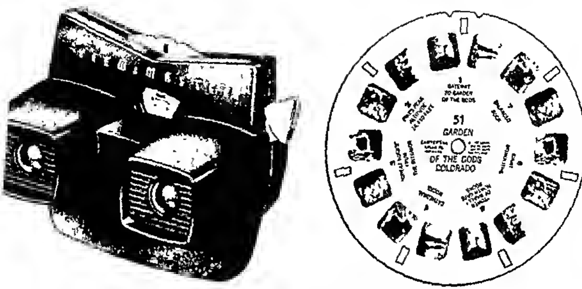

Fig. 4.18. This is one type of stereoscope, beside it is a stereograph which uses 16 mm. transparencies on disks. What are the teaching benefits of stereo views?

remain the most effective and practical means of presenting pictures in the lifelike realism of three dimensions.

SUMMARY

Flat pictures are a highly important type of audio-visual materials. They are inexpensive, readily available to all teachers, and highly effective as a means of communicating ideas.

The selection of good flat pictures for teaching involves consideration of their suitability for teaching purposes, artistic quality, clarity and size, validity, and interest.

Good pictures should be mounted. Good mounting not only preserves the picture but enhances its effectiveness. Teachers and older pupils can mount pictures effectively by following simple principles governing such factors as margins and the use of color. Several methods are available for making either temporary or permanent mounts.

Good classroom procedure in the use of flat pictures involves the selection of pictures in terms of specific purposes, their integrated use in the lesson, and the use of few rather than many pictures. Bulletin boards are an excellent means of displaying pictures. Opaque projection is particularly valuable in presenting small pictures for group work. Flat pic-

tures can also be studied by individual pupils either mounted or as stereographic views.

The effective use of flat pictures requires teacher direction. The instructor who recognizes the importance of the pupil's background, of specific points to look for, and of individual differences in ability to interpret pictures will secure the most satisfactory results from their use.

Suggested Activities

1. Have each student bring in several examples of good flat pictures in the respective subject-matter fields. Have the class evaluate a selection of these pictures in terms of the principles discussed in this chapter.
2. Have members of the class mount several flat pictures of different sizes, shapes, and colors. Discuss the effectiveness of the mounting used and suggest means of improvement.
3. Assign a committee to prepare a bulletin board display for the class on the subject "What Is a Good Picture?" Have the class evaluate the display as an effective bulletin board (a) from the display standpoint, and (b) from the standpoint of its teaching values.
4. Have a committee prepare an annotated and classified list of good sources of free or inexpensive flat picture materials for duplication and distribution to class members.
5. Have each pupil bring in a current issue of *Life*, *Look*, or a similar publication for use in a class discussion of the qualities of good photographs. Draw up a list of elementary suggestions on how to take good pictures.

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5.

Graphics

WEBSTER DEFINES GRAPHICS AS THE ART OR SCIENCE OF DRAWING—ESPECIALLY mechanical drawing. As applied to visual materials, however, the term "graphics" or "graphic materials" has a broader meaning than drawing alone. The original Greek *graphikos* included painting as well as drawing and the verb *graphein* means to write as well as to represent by means of lines. Furthermore, when used as an adjective, "graphic" carries with it the sense of vivid clarity, forceful description, and effective presentation.

Taken together, the above definitions combine readily into a practical concept of graphics as *materials which communicate facts and ideas clearly and forcibly through a combination of drawings, words, and pictures.* The drawings may take such forms as diagrams, sketches, or graphs. Words (and numbers) are used as titles and explanatory comment on graphs, charts, diagrams, and posters, and in cartoons and comic strips. Sketches, symbols, and even photographs are used in graphic materials to give meaning to facts, concepts, and ideas which by their nature lend themselves to graphic presentation. Thus "graphics" includes a variety of visual forms, principal among which is drawing in some form.

The instructional values of graphic materials lie generally in their capacity to attract attention and to convey certain types of information readily. Their particular role is to present facts and ideas in condensed, summarized form. A biology chart on cell division may outline the complete process of mitosis. A diagram of office organization may show quickly the channels of responsibility and departmental function. A graph of automobile production shows at a glance whether more or fewer cars are being produced this year than in preceding years.

CATEGORIES OF GRAPHIC MATERIALS

The graphic materials discussed in this chapter are as follows:[1]

1. Charts
2. Diagrams
3. Graphs
4. Posters
5. Cartoons
6. Comics

This list should not be regarded as rigidly fixed. Some diagrams may be simple, easily followed sketches made on the back of an envelope; others are intricate interpretations of complex functions or processes. Both are diagrams, but clearly the envelope sketch is far less abstract. Likewise, while a cartoon in a boy's magazine registers at once with a junior-high-school boy, a subtle cartoon in *The New Yorker* may well

ro

"charts" a general term inclusive of a variety of such ons as maps, graphs, pictures, diagrams, posters, and even cartoons. For purposes of clarity, however, it is desirable to consider charts as a distinctive medium of visualization with certain attributes of their own. Accordingly, charts are defined as cc*errelatianships graphic and pictorial media designed for the orderly an*...n the chart, a *izing of relationships between key facts or ideas.* The roots from which a of the chart is always to show relationships such as ...wing developments amounts, developments, processes, classification, and ... a chart

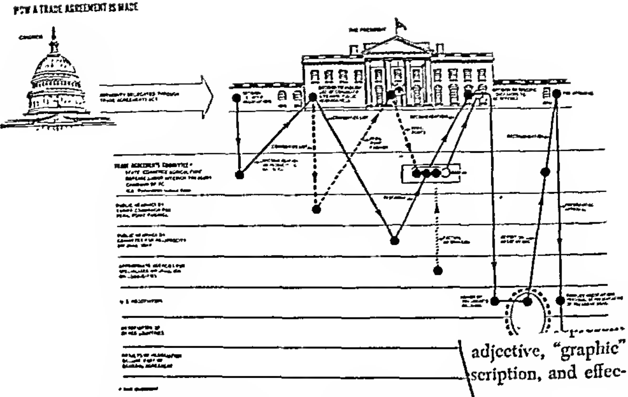
"What is the relationship between the mayor and the chief of police?"

"Where does the money come from to finance the operation of our schools?"

"When is a bill referred to the House Rules Committee?" ... planning

Such questions as these have a familiar ring to teachers of s... or government—and likewise to many of their perplexed pu...t product. the things a good teacher knows is that concepts such as the illustrate learned more readily when visualized on charts or diagrams.

[1] Maps and globes are sometimes included in lists of graphic materials. They are omitted here, however, because they are discussed specifically in chap. 7.



adjective, "graphic"
scription, and effec-

Fig. 5.1. Would a chart like this one be helpful in explaining a comple ily into a practical agreement is made? Can you think of a better method of clarifying such a s

The chalkboard may serve to convey simple relationships such as those ures. The mayor and the chief of police; but to show how a trade graphs. Words ade, a chart like that in Fig. 5.1 is likely to be consider- ment on graphul.

comic strips. Skete

graphic materials t

There are many types of charts; among them are classification charts, genealogy charts, flow charts, relationship charts, tabulation charts, and chronology charts.[2] The charts most commonly used in teaching are genealogy or tree charts, flow charts, and chronology or tabular charts.

capacity to

readily. Th

summarizame suggests, the *tree* chart is developed from a base/com- plete or several "roots" which lead into a single trunk. The branches,

[2] See Willard C. Brinton, *Graphic Presentation*, Brinton Associates, New York, 1939, chaps. 3–8, 31, for descriptions and uses of the types of charts listed.

U. S. AUTO INDUSTRY DEPENDS ON FOREIGN TRADE

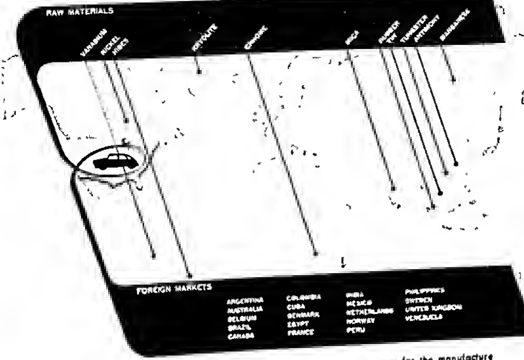


Fig. 5.2 This reverse form of a stream chart shows what imports are necessary for the manufacture of automobiles. Could the same information be presented with similar effectiveness by another form of chart?

.errelationships

in turn, represent developments and relationships. A goan the chart, a genealogy chart in which two individuals are the roots from which a family "tree" grows. The tree chart is useful in showing developments resulting from a combination of major factors. For example, such a chart is suitable for showing the many by-products obtainable from coal. It is likewise effective in showing how iron ore, limestone, coke, and various chemicals may be combined to produce a varwhat difficult to steel. 'reful planning

Sometimes a reverse form of the tree chart is useful in s great variety of elements are combined to form one important product. This type of chart is known as a *stream* chart. It can be used to illustrate the interdependence of an industrial nation with other countries; thus our automobile industry requires chrome from South Africa, etc. (see Fig. 5.2).

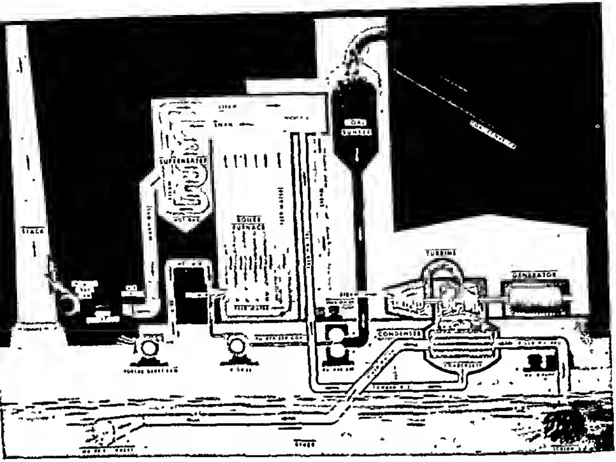


Fig. 5.3. This representation of a steam turbine generator combines characteristics of at least two types of graphic. Can you identify them?

tures. The c

graphs. Words

ment on grap

The organization of a student council or a unit of government, the development of a manufacturing process, or the steps whereby a bill becomes a law can be shown to advantage in a *flow* or organization chart (Fig. 5.3). This chart is well suited to showing functional relationships and is used widely in industry and government for that purpose.

genealogy or tre

capacity to

readily Th lationships such as those in a historical time line or a timetable can be shown on a *tabular* chart. One of the unique values of the tabular chart is its ability to show time relationships. Variations of this form of chart include tables of information such as arguments for and against a bond issue, nations participating in the United Nations, etc. (Fig. 5.4).

Membership of European Countries in Regional Organizations

	Countries	North Atlantic Treaty Organization	Organization for European Economic Cooperation	European Payments Union	Western European Union	European Coal & Steel Community	Council of Europe	Economic Commission for Europe	Balkan Pact	United Nations
OVERSEAS	(United States)	●	○					●		●
	(Canada)	●	○							●
WESTERN EUROPEAN	Belgium	●	●	●	●	●	●	●		●
	France	●	●	●	●	●	●	●		●
	German Federal Republic	●	●	●	●	●	●	●		
	Italy	●	●	●	●	●	●	●		●
	Luxembourg	●	●	●	●	●	●	●		●
	Netherlands	●	●	●	●	●	●	●		●
	United Kingdom	●	●	●	●	○	●	●		●
	Denmark	●	●	●			●	●		●
	Iceland	●	●	●			●	●		●
	Norway	●	●	●			●	●		●
	Portugal	●	●	●				●		●
	Greece	●	●	●			●	●	●	●
	Turkey	●	●	●			●	●	●	●
NEUTRALS	Yugoslavia							●	●	●
	Ireland		●	●			●	●		●
	Sweden		●	●			●	●		●
	Switzerland		●	●				●		
	Austria		●	●				●		●
SOVIET BLOC	Soviet Union							●		●
	Poland							●		●
	Czechoslovakia							●		●
	Hungary							●		●
	Rumania							●		●
	Bulgaria							●		●

○ [illegible]

the title and subtitles and sh

the class.

s this tabular chart help to simplify the subject presented?

rials of an abstract c

A diagram is a simplified *drawing designed to show interrelationships primarily by means of lines and symbols.* Even more than the chart, a good diagram is highly simplified; only the most essential elements are shown. It is likely to be more difficult to read than a chart because it may be only a line, a bare outline of a real object, or a cross-sectional sketch of an object like a cylinder.

A typical diagram is shown in Fig. 5.5. Put yourself in the pupils' place as you attempt to analyze it. Does it seem somewhat difficult to understand? If so, this should indicate the need for careful planning in using diagrams with your classes.

Although charts are condensed visual summaries of facts and ideas, diagrams are even more condensed and rely heavily on symbolic means of representing ideas. In order to be effective, both charts and diagrams must concentrate on key ideas and dispense with unessential details. Full understanding of a diagram usually requires a background of learn-

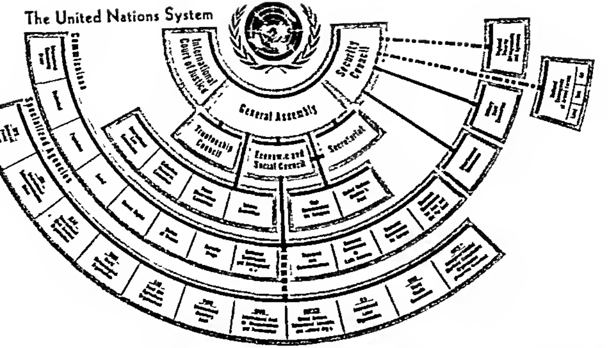


Fig. 5.5. Diagrams are usually quite abstract. How is abstraction shown in this diagram of the United Nations?

ing and first-hand experience. Most of us are uoa schematic diagram of a television receiver becaus edge necessary to interpret it. What does this sug characteristics of at least two the use of diagrammatic materials in teaching?

Little research has been done on the ability of children to read diagrammatic materials. A series of four studies by Malter with elementary-school pupils revealed that most children of elementary-school age have considerable difficulty in reading cross sections, process diagrams, and conventionalized diagrammatic symbols, such as diagrams of a gasoline engine and lift pump. A follow-up study revealed that the addition of clarifying materials such as photographs of the actual object aided the children greatly in reading a cross section. A second follow-up study showed that when simple directions such as "Start Here and Follow Arrows" were added to a process diagram of a flour mill, the children were materially helped in interpreting the diagram correctly, although there was evidence of a need for still further improvement in it.[3]

Malter's studies support the principle that *diagrams and similar mate-*

[3] Morton S. Malter, "Children's Ability to Read Diagrammatic Materials," *Elementary School Journal*, October, 1948, pp. 98–102.

MULTILATERAL TRADE MAKES WORLD PROSPERITY

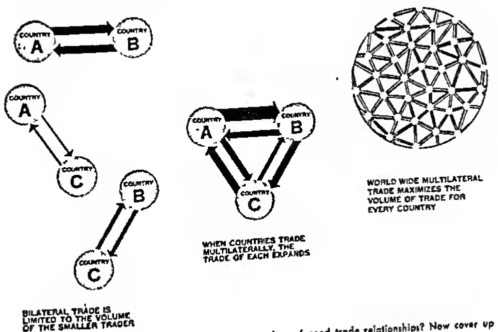


Fig. 56. Does this diagram help make clear the values of good trade relationships? Now cover up the title and subtitles and show it to someone who has not seen it before. Report their reactions to the class.

rials of an abstract character require careful foundation work before they can be used efficiently with a class of pupils.* It follows that diagrammatic materials usually lend themselves better to summary and review than to introductory use in a lesson. As the teacher realizes, the interpretation of even such relatively concrete media as pictures depends heavily on the experience which the child can bring *to* a picture. A diagram of the steps in flour processing will have much additional meaning *after* the pupil has had an opportunity of studying how flour is made and perhaps going through a flour mill.

A second principle is that *other appropriate audio-visual materials should be used with charts and diagrams to make them more understandable.* Such materials as pictures, slides, filmstrips, and motion-picture films all have as their basic functinn the clarification of significant concepts. While each audio-visual medium has certain unique advantages in a specific instance, the coördinated use of several types of audio-visual materials yields the best results in most teaching situations. This

is particularly true in the case of charts and diagrams because of their high degree of abstraction.

"DO-IT-YOURSELF" CHARTS AND DIAGRAMS

Teachers and pupils can make their own charts and diagrams to supplement those secured from other sources. Simple and effective charts can be prepared easily and do not require particular artistic skill. By following a few suggestions, anyone who can draw a straight line with a yardstick and use a pair of scissors can make charts and diagrams that will help present key ideas better, in many cases, than might be possible with purchased charts.[4]

Suggested Procedure

1. Lay out a plan for the chart on a sheet of paper 8½″ x 11″ or smaller.
2. Keep the chart simple. Remember that a good chart or diagram presents *one* principal idea or comparison. When it becomes intricate or complicated, it loses effectiveness. It should convey an impression at a glance.
3. Make the chart large enough to be seen *easily*. A chart for classroom use should be large enough to be read from any point in the room.
4. Make it attractive. Use contrast, color, and plenty of space.
5. Achieve contrast by using dark letters and figures on a light background or light letters on a dark background. Be sure that the important things stand out.
6. Use color when suitable. Even though color pleases the eye, don't overdo it. Keep the colors harmonious.
7. Remember that space is highly important. Leave plenty of space—at least equal to the filled-in space on the chart, and preferably more. Keep the margins generous.
8. When your plan is complete, sketch it lightly in pencil on the chart and complete it. An opaque projector is valuable in transferring your small sketch to a larger surface.

Materials

1. Gummed or cardboard letters and numbers are available in all sizes and types. Inexpensive sets provide several sizes of letters and figures

[4] See p. 550 for a list of sources of charts and diagrams.

in adequate quantities. Sources of such materials are listed on pages 543–544.

2. For bars, lines, etc., black or colored tape is both easy to use and inexpensive. Colored cellophane tape can be bought in a stationery store, and colored paper tape 7/8" wide in art supply stores. The latter can be secured for a nominal sum in red, green, blue, brown, black, and white in rolls of 10 yards. Rolls of black gummed tape in widths ranging from 1/8" to 1", and various gummed symbols such as arrows, circles, stars, and ovals can be purchased from local art supply stores.
3. Lettering pens, India ink, and drawing ink in various colors are good for outlines or straight lines. Speedball pens in several sizes can be purchased from a stationery store for a few cents per point. Better for extended lines are Payzant freehand lettering pens, available in stationery stores in various sizes. The #00 draws a 3/16" line, the #0 a 1/8" line, the #2 a 1/16" line, etc.
4. Cornell board or other light-surfaced building boards are good for a base. Cornell board can be purchased in sheets 4' x 8' and cut to desired sizes. Large sheets should be braced or framed to avoid warping. Bristol board, a 10- or 14-ply cardboard, is suitable for smaller charts and does not require bracing. It may be obtained from stationery, art supply, or school supply houses in white or colors in sheets up to 30" x 40" at moderate cost. Various other materials can also be used. For example, a mattress carton obtained from a furniture store at little or no cost provides a good-sized piece of corrugated cardboard which can be painted over.

GRAPHS

Graphs may be defined as *visual representations of numerical data.* A table of figures may contain a wealth of valuable information, but a graph of the same data presents the gist of that information quickly and effectively. Furthermore, graphs reveal important relationships in the data—relationships such as trends and variations from normal. Finally, and of significance for the teacher, graphs are inherently more interesting than number tabulations, however well arranged the latter may be.

When Miss Gray wants to keep interest in library reading running high, one thing she may do is to post a progress graph showing the

number of books read by each pupil in her class. Progress graphs can be purchased from school supply houses; these graphs have a number of bright red bars that are revealed by removing small sections of the overlaying paper. The pupils' names are inserted on the chart and one section of the overlay is removed for each completed project.

The appeal of graphs is not limited to youngsters. Who is not familiar with the large thermometers used to register progress in fund-raising campaigns for the Community Chest, the March of Dimes, or the new church to be built on the corner? The businessman relies on graphs to show the trends in his sales volume and he refers continually to them for information on business in general.

It is well to remember that the major purpose of graphing is to present comparative, quantitative information quickly and simply. When a graph is intricate and difficult to read, it loses its chief advantage. Graphic concepts that are complex are more effectively presented, as a rule, in a series of simpler graphs than in one intricate composite. If a composite graph is desirable, it should follow a series of supporting graphs.

TYPES AND ADVANTAGES OF GRAPHS

There are many kinds of graphs. Among those most commonly used are the line, bar, circle or "pie," and the pictorial graph. Each type has certain advantages and applications.

Line Graphs

The line graph is the most accurate of all graphs. It is therefore particularly useful in plotting trends or relationships between two series of data. A line graph should be used when a considerable number of data are to be plotted or when the data are continuous. The line graph shown in Fig. 5.7 was plotted from continuous data.

Numerous variations and combinations of the simple line graph are used, including shaded surface graphs of several types, and silhouette graphs. These and two familiar graph forms, the bar and circle, are shown in Fig. 5.8.

Opposite page: Graphic presentation takes many forms. Its strength lies in showing trends and in enabling quick comparisons of quantitative statistics. Note how color helps to make these graphs on the growth of industrial capacity and school enrollment (see reverse of page) more striking and effective.

Bar Graphs

Bar graphs are probably the simplest of all graphs to read. They are also easily constructed. Each of the several groups of data to be plotted is represented by either vertical or horizontal bars. The length of the bars expresses the amount or percentage of the data; all the bars are of the same width. The bar grapb is employed to best advantage when the number of values to be compared is small—usually no more than six or eight. Occasionally a larger number of bars are used, but in such instances additional elements such as color or pictorial representations are needed to make the graph more readable and interesting. (See the accompanying two plates.)

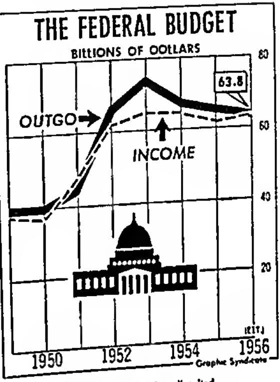


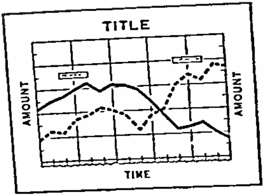
Fig. 5.7. Why is a line graph well suited to present this information?

Circle or Pie Graphs

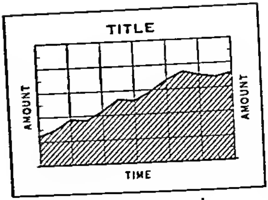
When the intermediate-grade teacher introduces the subject of fractions, he may begin by cutting an apple into halves and quarters. He may apply a similar technique with the feltboard, fitting segments of a circle together to form the complete circle.

The circle or pie graph is a circle the sectors of which are used to represent component parts of a whole. Such information as the sources of the school dollar, the distribution of expenditures of a municipality, or the proportional sources of the world's petroleum supply can be well represented by pie graphs. A good example is shown in Fig. 5.9.

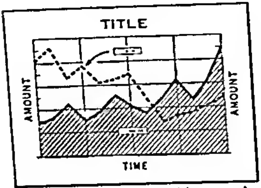
Two characteristics are common to all circle graphs. (1) They always present totals or whole amounts, and (2) their parts or segments are calculated in percentages or fractional parts of a whole. If a nation produces 10,000,000 tons of coal per year and 7,500,000 tons are bituminous, 2,000,000 anthracite, and 500,000 lignite, this information can be shown



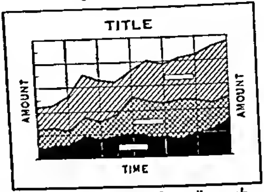
Line graph



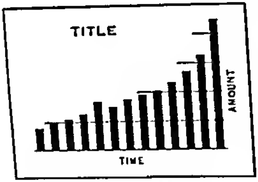
Single-surface graph



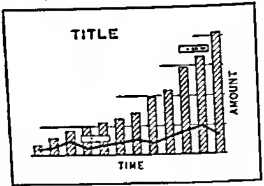
Combination surface and line graph



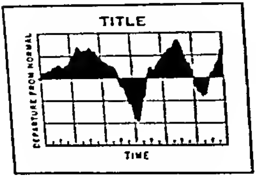
Multiple-surface or "Strata" graph



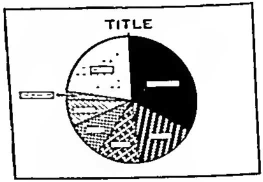
Column graph (single-series)



Combination column and line graph



Silhouette graph



Sector or "Pie" graph

Fig 58. What kind of information is particularly well suited for each of these kinds of graphs?

on a circle graph by shading 75 percent of the circle to represent bituminous production, 20 percent for anthracite, and the remaining 5 percent for lignite. When the point being made is the relationship of individual quantities to a whole, the pie graph is a natural and easily understood device to use. Research indicates that circle graphs are the most accurately read of all common graph forms when used to compare parts of a whole.[5]

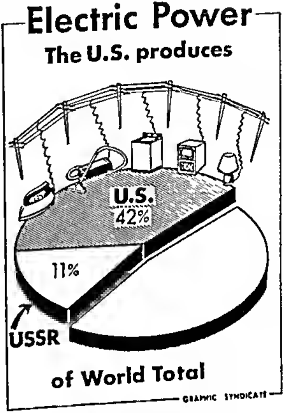


Fig 5.9. The circle or pie graph is used to show parts of wholes. Is this an appropriate use for a circle graph?

Area and Solid Figure Graphs

Other area graphs such as squares, circles, and irregular figures are occasionally used to compare two or three related totals. Frequently pictorial figures such as people, cattle, ships, or automobiles are used in this manner (see Fig. 5.10). Generally speaking, graphs that depend on comparable areas to present information are read less easily than line, bar, or circle graphs. This is because it is difficult to compare accurately two areas of different size without measuring them. Such graphs, therefore, sacrifice some of the definitive quality and readability which are characteristic of effective graphs.

One value of the area graph, however, is the fact that it is used infrequently enough to be somewhat unusual; hence it catches the eye quickly. Another advantage is the fact that the area graph takes less space than other types. For example, you can fit into a fairly small space two squares or two circles of different sizes representing two comparable amounts. The same information on a bar or line graph would require a considerable larger area.

[5] Lewis V. Peterson and Wilbur Schramm, "How Accurately Are Different Kinds of Graphs Read?" *Audio-Visual Communications Review*, Summer, 1954, pp 178–180.

The solid figure graph (Fig. 5.11) contains spheres, cubes, or other figures that give a three-dimensional effect. Although more striking and interesting in appearance than the flat type of area graphs, some solid figure graphs have the similar disadvantage of being less easily read than simpler forms of graphs. In fact, many solid figure graphs require comparisons to be made in terms of cubic content, or volume—rather difficult

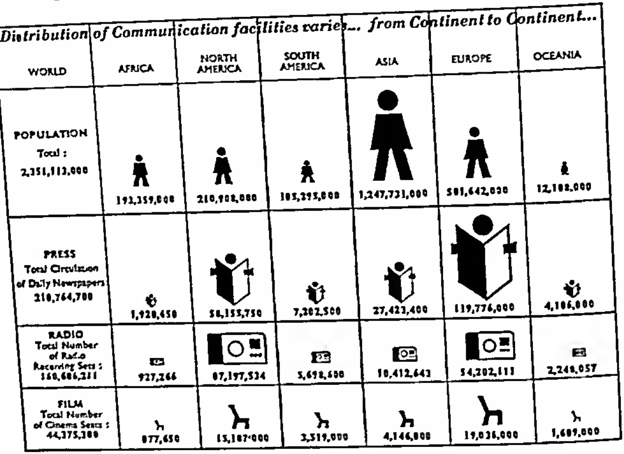


Fig. 5.10. Why are area figures useful for presenting this information?

to do with the same degree of accuracy as is possible with a circle or bar graph.

It is worthy of note that the addition of a third dimension does not of itself apparently make for less accurate reading of a graph. Peterson and Schramm[a] compared the relative accuracy with which 86 airmen could read eight types of graphs; each graph, unknown to the airmen, embodied the same five proportions totaling 100 percent. (See Fig. 5.11.)

[a] *Ibid.*, pp. 184–195.

The findings indicate that the square column graph was read as accurately as the ordinary multiple bar graph. However, there was significantly less accuracy in reading the multiple cylinders than the multiple squares. Least accurately read of any of the eight graph forms were the multiple area column graphs.

It should be noted, as these researchers point out, that the above findings pertain specifically to graphs in which parts are compared to the whole. Further studies are needed to determine the relative effectiveness of various graph forms in quantitative comparisons which do not add up to 100 percent.

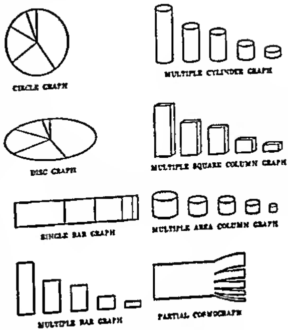


Fig 5.11. How accurately are different kinds of graphs read? Which of these eight types do you think are most readable? Do your conclusions concur with the results of the research from which this illustration was taken?

Solid figure graphs are highly effective when pictorial figures are used instead of spheres or cubes. The novelty and realism of the pictorial solid make it the most attractive and attention-getting of any of the graphic forms. For this reason it is frequently used to give variety and interest to a long series of graphs or to focus attention on a highly significant comparison in such a series. The precise information is conveyed by the printed text on or beneath the graph itself.

Pictorial Graphs

Much of the eye-catching appeal of three-dimensional figures is attained by the flat, simplified, picture-like figures used in pictorial graphs. Pictures of this type give the graphic form realism and interest. This type of graph, now used widely in magazines and newspapers, is as simple to read as a bar graph and it has the added advantage of using realistic figures to convey meaning. An example is shown in Fig. 5.12.

Pictorial statistics were first introduced in Vienna by Otto Neurath, an internationally known sociologist. Neurath constructed figures and symbols which he called "isotypes," variations of which are now used

in most countries of the world. The immediate popularity of these "international pictographs" was due to the fact that they constituted a language equally intelligible to all nationalities. These graphic symbols are easily understood by students at all grade levels and at most levels of intelligence.

Symbols such as the Neurath isotypes are striking because they can be identified at a glance. A picture of a cow, a man, a woman, a child, a

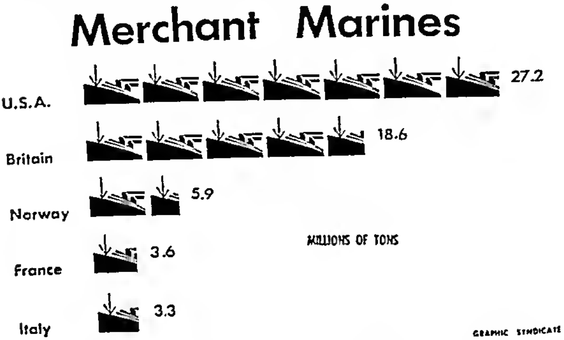


Fig. 5.12. In this pictorial graph, why are ships of one size used rather than ships of different sizes to show different amounts?

ship, or a sheaf of grain is understandable by virtually all peoples. Neurath found out how pictures of such universally familiar items could be simplified to their essentials, and on this basis developed his isotypes.

PRINCIPLES OF GRAPHING

Pictorial statistics may be used on any type of graph. Their use involves no special technique beyond that required for the basic graph form itself.

The principle of simplicity, for example, applies to all graphs. Intricate graphs may occasionally be necessary in plotting a variety of related factors for industrial or economic purposes, but such graphs

sacrifice communication effectiveness. The most effective graphs highlight one or two ideas.

Another principle applicable to all graphs is that comparisons or relationships must be shown. Wheat production for a single year is not suitable for graphing unless it is compared with wheat production in other years or with the production of other grains in the same year. Graphing requires comparative data of some kind. Without comparisons or relationships to make them meaningful, there is little advantage in presenting statistics graphically.

A third principle of good graph construction is that approximations rather than precise amounts should be shown. A graph is intended to tell a story at a glance—to present comparisons, trends, and relationships. For these purposes minute details not only are unnecessary but tend to complicate the graph and to detract from its effectiveness.

In addition there are two principles which apply particularly to pictorial graphs. (1) The pictorial symbols should be self-explanatory. (2) Quantities are usually indicated by the number of symbols rather than by their size. Amounts indicated by several symbols of the same size are more easily comprehended than amounts indicated by the areas of similar but different-sized symbols. The reason is that accurate judgment of the area of an irregularly shaped object is difficult. [illegible] pictorial graphs normally use figures of one size, each figure [illegible]angle. The drawing nite quantity; partial amounts are represented [illegible] attention. From example, each ship in Fig. 5.12 represents four m[illegible]low it.

USING GRAPHS IN TEACHING

Pictures convey meaning readily because they usually contain many elements already familiar to the student. Graphs, on the other hand, are principally symbolic and abstract in character; hence they are best used in the body and summary of a lesson after the student has acquired a background of information from other sources.

Children learn about graphs in intermediate-grade arithmetic—how to make them and how to read them. They see graphs in newspapers, magazines, and textbooks. Consequently graphic materials need not be regarded as completely foreign to a child's experience. The pictorial graph in particular is readily grasped by upper-grade or older pupils.

But the graph is by nature a summarizing device. It visualizes totals and the relationships between totals over a period of time. It expresses certain quantitative conclusions about a particular subject, such as immigration during a certain period, or comparisons of the steel production of several nations.

The good teacher seldom begins a lesson with conclusions. To do so is to apply the principles of deductive rather than inductive reasoning. Most teachers find that learning is more efficient and productive when it proceeds from information and ideas to their application and then to the principles or generalizations arising from a number of such applications. Somewhere between these extremes in the learning process are the necessary quantitative summaries which can best be presented by graphs.

During their study of the Scandinavian countries, for example, the pupils will profit from the use of graphs showing the trends in such factors as population, exports, and ocean shipping in each country over a period of years. Later, when comparing and summarizing their learning about the three countries, students will again find graphs a particularly helpful device. The experience acquired through various learning activities and materials such as books, pictures, films, and other media enables them to gain a kind of comprehension of the graph which would have at earlier stages of the learning experience.

Fig. 5.12. In this pictorial g
to show different amounts?

ographer, was commissioned by Sarah Bernhardt, pare some large-scale advertising illustrations for her forthcoming stage appearance in Paris. It was there that the poster was born, for Miss Bernhardt's idea was a notable success.

Somewhat later the French army adopted the poster idea for recruiting purposes. By World War I the American government was making extensive use of posters in recruiting for the armed services. Particularly effective were the posters prepared for the war loan drives during that war. Literally millions of these posters were distributed; they were prominently displayed on street corners all over the United States. The impact of these posters on the public was regarded by Treasury officials as a highly significant factor in the success of the loan drives.

Thus the poster has come to fulfill a unique function among visual

communication media. Its role is very quickly to implant or to remind the viewer of a single important idea—"Buy Savings Bonds," "Join the Navy," "Support Your Team," "Drive Safely," "Keep the School Clean," etc. Hence the poster must have strong eye-appeal if it is to attract attention and have enough holding power to put its message across. Accordingly the poster may be defined as a *visual combination of bold design, color, and message which is intended to catch and hold the attention of the passer-by just long enough to implant a significant idea in his mind.*

CHARACTERISTICS OF POSTERS

Good posters must therefore have a dynamic, impelling quality. They must be essentially simple for there is not time to involve the viewer in detailed study. They must also be striking enough to attract attention or their usefulness is lost.

Dramatic Simplicity

To attract attention, the prominent features of the poster must stand out sharply. These features may be a photograph, a drawing, or a striking design. The recruiting poster of World War II (Fig. 5.13) showing Uncle Sam pointing his finger directly at the observer is unforgettable.

The eye-catcher in that poster is the head of Uncle Sam, shown against a solid blue background. His piercing eyes and pointing finger seem to follow and hold the observer from any angle. The drawing is vivid and striking enough to reach out and command attention. From it the eye travels quickly to the printed message below it.

Appropriateness

Not all posters carry such a high degree of the dramatic; they must rely on other means of attracting and holding attention. Advertisers make extensive use of poster techniques to call attention to their products. They naturally strive for appropriateness in subject matter, because inappropriate treatment results in a psychological "letdown" that defeats the poster's purpose.

It would be unsuitable, for example, to use an extremely dramatic illustration in an advertisement of soap, nylon hosiery, or baby powder. For such products advertisers often rely on universal eye-catchers like babies and attractive models. Appropriateness of the illustration to subject and purpose is characteristic of good posters.

Fig. 5.73 Good posters catch and hold attention long enough to put across an idea. How is this accomplished in this poster?

Limited Text

Most posters rely to some extent on words to convey the specific idea or message. Two things should be remembered, however, with respect to the use of words on posters. (1) Few words are generally used, and (2) key words are made to stand out by means of type size or position. The three words in the poster shown in Fig. 5.14 convey the meaning to the reader more effectively than a long sentence would.

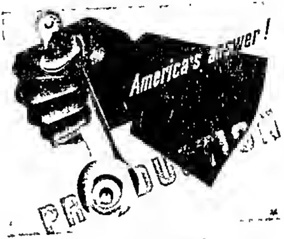


Fig. 5.14 Simplicity of design and few words characterize strong posters. Note how sharply the idea is conveyed in this World War II poster.

Attractiveness

Posters which are effective are usually pleasing to the eye. Although this is not necessarily true in the case of highly dramatic subjects such as war, traffic safety, fire hazards, and the like, even in these fields posters embody good design, good lettering, and attractive color. Other types of posters, such as those used for school courtesy and housekeeping campaigns, need to be attractive in order to hold attention once it has been caught. The attractive poster is inherently pleasing and interesting, both powerful factors in learning.

Design and Color

Composition, color, and technique are the principal elements in effective poster preparation. These elements are also applicable to flat pictures, charts, billboards, and bulletin boards—in fact, to any pictorial medium. But just as each medium has certain unique characteristics, so does it have certain mechanical requirements which differ from those of other media.

Like a photograph or painting, a good poster requires a center of interest, but in a poster this center needs to be particularly strong and commanding (Fig. 5.15). For this reason subtlety is usually avoided in favor of unmistakable contrast and emphasis. A painting or photograph, on the other hand, frequently contains extensive detail and generally has to be studied to be fully appreciated.

Color provides meaning and expression as well as beauty in a good painting. It provides force and contrast as well as attractiveness in a good poster. These uses of color are not the same, although both are important. The distinction again is based on the quite different purposes for which posters and paintings are created.

Fig. 5.15. Creative imagination, plus a good center of interest, helps put the idea across. Can you think of other ways in which the idea that airplane travel saves time could be conveyed on a poster?

The poster thus is unique in both purpose and construction. This is not to say that poster techniques exclude the characteristics found in other visual forms. Some posters use portraits, with all their detail, as the center of interest, as in the case of the recruiting poster in Fig. 5.13. Other posters may have a complete photographic background for their principal theme, or even a combination of such scenes. In such instances the photographic background is normally subdued so that the message carried by the poster will stand out clearly.

SUGGESTED USES OF POSTERS

From what has been said about the poster and its purposes, several uses suggest themselves to the classroom teacher.

For Motivation

The first of these uses may be called motivational or stimulative. A set of good travel posters on Great Britain could be used effectively in arousing curiosity and interest in a study of modern Britain. A poster on the resort area of Bath will suggest several leads to the teacher. For example, a discussion of what the poster shows may be initiated, or other resorts may be located on a map of England. There is also an opportunity of bringing out the fact that the people enjoy some of the same recreations

we do—swimming, sun bathing, and boating. Here is a possible starting point for understanding—a point of familiarity and common interest.

As Reminders

A second use of posters may be termed a reminder or awareness use. By the time he reaches the intermediate grades every child knows that brushing his teeth regularly is important. But, as teachers and parents are well aware, knowledge alone is seldom enough. There is need for frequent and varied methods of "jogging" the learner so that he will put his knowledge into regular practice until it becomes habitual. One means of doing this is by health posters strategically placed and frequently changed; such a poster is shown in Fig. 5.16.

Remember the remarkable ability of the human mind to become accustomed and indifferent to its surroundings. Like a bulletin board which is seldom changed, the poster which is seen too often tends to become simply a part of the environment. When it loses its freshness, the poster loses its principal value—the power to attract the eye and to impress the observer with an idea.

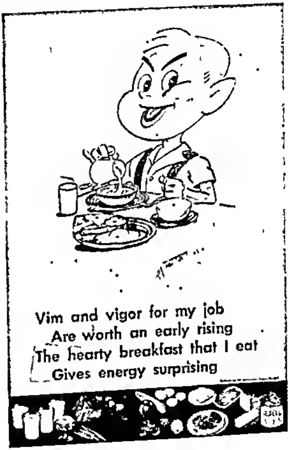


Fig. 5.16. Posters, like other visuals, must be designed with the age level and normal interests of the intended viewers in mind. Note how this poster is aimed at the early elementary-school child.

For Atmosphere

There is a third type of use, however, in which the poster may continue to be valuable after its initial impact has passed. This may be called the atmosphere or environmental use. Teachers of foreign languages frequently find that good posters, as well as pictures, paintings, and exhibits, assist in creating a desirable

atmosphere or feeling for the country whose language is being studied. Attractive poster materials enhance this atmosphere, particularly if they are artistically good.

For Creative Experience

A fourth helpful use of posters in teaching lies in their creative and participation possibilities. They present an opportunity for the student, by making his own posters, to give expression to what he has learned. In other words, the poster may be a culminating and application type of activity that arises from a unit of work. A few students in a class in English literature, for example, might prepare posters for a Shakespearian display. In studying political campaigns history students can trace many interesting parallels in the political posters used at the turn of the century and those used today. Social studies committees and student councils analyzing current school problems such as playground safety, lunchroom conditions, recreational programs, and corridor traffic between classes find well-prepared posters an effective means of expressing their conclusions.

In Campaigns

The above use of pupil-prepared posters in connection with class activities is closely related to a fifth use which is perhaps most familiar of all. This is the campaign or advertising use of poster materials for school activities. Election campaigns for members of the student council, class plays, athletic contests, cleanup campaigns, music festivals, forensic contests, hobby shows, and the like are "naturals" for the preparation and use of posters.

Here is an excellent opportunity for the school to capitalize on the natural drive of pupil interests to accomplish socially important and desirable objectives. If these activities are treated as an important part of the school program rather than as peripheral and extracurricular activities, much valuable educational experience can result. In this experience the poster can be properly integrated as one of the important media for communicating ideas.

PREPARATION OF POSTER MATERIALS

As suggested above, pupil-made posters have much to commend them, from the standpoint of both experience and communication.

Psychologically the pupil is primarily interested in his immediate surroundings and the concerns arising from them. This is one of the bases for the educational principle that we must start instruction where the child *is* and go on from there. This principle means, further, that effective instruction makes use of natural interests wherever practicable, and develops new experiences on the familiar foundations of the old.

The social studies teacher, in applying this principle of learning, encourages active interest in school political campaigns as one means of developing an understanding of politics in a democratic society. One of the activities implicit in such campaigns is the use of slogans, banners, mottoes, and, of course, posters. Such posters, however, cannot be bought; therefore they must be made by the pupils. "Pupil-made posters," in the words of one social studies specialist, "represent the fruition of social concepts and measure the effectiveness of teaching. Their construction and presentation is more apt to result in personal and social growth of students than is the display of posters secured from travel or advertising agencies."[7]

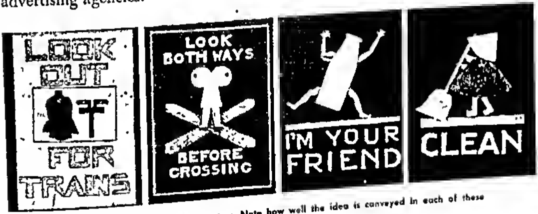


Fig. 5.17. Pupils can make excellent posters. Note how well the idea is conveyed in each of these examples.

The pupil-made poster likewise is well suited to publicity for such school activities as plays and athletic contests. It may well reach its maximum effectiveness in cleanup, safety, courtesy, and similar campaigns, particularly when the campaigns are pupil-initiated. Such posters, like those shown in Fig. 5.17, serve as reminders and stimulaters

[7] Harris Harvill, "The Use of Posters, Charts, Cartoons, and Graphs," *Eighteenth Yearbook of the National Council for the Social Studies*, 1947, p 120

Fig. 5.18. A way of making posters by paste-ups of cutout sections is illustrated here.

of socially desirable action or as deterrents to undesirable behavior.

Construction of a good poster is not difficult; Fig. 5.18 indicates one way of making effective posters. The teacher should know what qualities constitute a good poster and how to make one so that he can help his pupils. The art teacher is often glad to assist, for poster work provides an excellent opportunity for the desirable integration of art and other subject-matter fields.

CARTOONS

Still another unique medium for communicating ideas is the cartoon. The serious cartoon is *a pictorial representation or caricature of a person, idea, or situation that is designed to influence public opinion.* Although an increasing number of excellent cartoons are intended merely to make people chuckle—as is true of those in *The Saturday Evening Post*, for example—it is the cartoon as an instrument of propaganda that has the chief potentialities in teaching. It is the latter type with which the following discussion is concerned.

ESSENTIAL CHARACTERISTICS OF CARTOONS

A good cartoon is built around a single idea. Typically it may employ caricature, satire, exaggeration, symbolism, and humor of a sort. The humor may and frequently does extend to outright ridicule, particularly in cartoons on controversial political subjects in highly partisan newspapers. In some cases the extensive use of cartoons on political and social

subjects has given this medium an abusive characteristic typified by personal attacks on high-placed officials.

The power of the cartoon to influence public opinion lies in its compactness, its simplification of issues, and the considerable interest that can be aroused by sharply drawn illustrations laced with humor. It is a predigested source of information with a strong visual impact. Many persons who may not read a newspaper's editorials follow its cartoons regularly. Thus it is that the militant cartoonist on large metropolitan newspapers is regarded as a potent factor in forming public opinion.

HOW CARTOONS BEGAN

The modern political-social cartoon originated during the nineteenth century.[8] Andrew Jackson and his spoils system were among the first subjects of political caricature. Later, in the 1860's, Thomas Nast conducted his famous cartoon campaign against the notorious Tweed Ring in New York. It was Nast who created the now standard symbols of the Democratic donkey and the Republican elephant. Nast and Joseph Keppler, the latter the originator of the famous cartoon character "Puck" during the same period, set a pattern of attack against individuals as a means of getting at important issues. This pattern still characterizes most American cartoons on political and social subjects.

The use of the cartoon psychology of lampooning man and his foibles goes back to ancient times. Archaeologists have uncovered on the walls of ancient buildings many drawings which poke fun at the great and the pretentious. Medieval manuscripts contain similar evidences of refreshing humor directed at persons and groups prominent in contemporary society. One writer has drawn an interesting analogy between the functions of the king's jester in medieval times and those of the modern cartoonist.[9]

EVALUATION AND SELECTION OF CARTOONS

The answer to the question "What is a good cartoon?" is somewhat elusive, since a cartoon is so much a product of the creative imagination, skill, and individuality of the cartoonist. Yet there are certain qualities

[8] Albert J. Nock, "The King's Jester: Modern Style," *Harper's Magazine*, March, 1928, p. 482

[9] *Ibid.*, pp. 481–488

which are typical of effective cartoons, and knowledge of these qualities can be helpful in selecting cartoons for teaching purposes.

Appropriateness to Experience Level

The first consideration, of course, is that the meaniog of the cartoon be understandable by the class in which it is to be used. A cartoon on foreign aid or the cold war, for example, will have little meaning for a sixth-grade pupil who has not studied these topics. Likewise, while many teachers will get a chuckle out of Fig. 5.19, few youngsters will see its humor. The same pupils, on the other hand, may readily interpret a fairly subtle cartoon on traffic safety or sportsmanship.

Fig 5.19. For what specific audience is this cartoon intended?

Schaffer's study of children's interpretations of social and political cartoons found that, on the average, children begin to interpret such cartoons abstractly at about age 13. The range of greatest increase in percentage of abstract response to symbolic drawings occurs between Grades 6 and 8.[10] An analysis of erroneous interpretations, furthermore, showed that the absence of meaning of word elements in cartoon captions—in other words, lack of a background adequate to give correct meaning to the words used—was a particular cause of error.[11]

Simplicity

Assuming that the cartoon's meaning is understandable, there are certain desirable physical characteristics common to good cartoons. One of these is simplicity. Generally speaking, the better cartoons contain only essentials; they depend more on key characteristics for recognition than

[10] Laurence W. Schaffer, *Children's Interpretation of Cartoons*, Bureau of Publications, Teachers College, Columbia University, New York, 1930, pp. 51–52.
[11] *Ibid.*, p. 60.

on extensive photographic detail. Uncle Sam's top hat and striped trousers, Roosevelt's chin and cigarette holder, and John L. Lewis' bushy eyebrows are familiar examples. A few sharp lines, some shading, and the necessary background sketched in lightly are the principal mechanical ingredients of a good cartoon. The creative artistry and imagination of the cartoonist are evidenced by the overall effect he can attain with these physical elements and an idea.

Another physical characteristic is brevity of caption. Some cartoons need no captions, the picture itself conveying the idea without verbal assistance. Although the political-social cartoon usually requires a caption, it should be clear, brief, and to the point. Extensive explanation is unnecessary if the cartoon is well conceived and well executed.

Clear Symbols

A third quality of effective cartoons is clarity of symbolic meanings. John Bull, Uncle Sam, the Republican elephant, and the Democratic donkey are standard cartoon symbols whose meanings are well understood by the newspaper-reading public generally. Such characterizations as the burdened taxpayer, the opulent business mogul, the unemployed workman, the laboring man, and the "politician" are also understood without difficulty if the rendition is good. Symbols representing more abstract concepts such as states' rights, humanity, the "common man," tariff walls, "one world," and freedom, on the other hand, are more difficult to devise. Here the cartoonist's ability is challenged to the utmost. Accordingly, teachers must be careful to select cartoons whose symbols are not too abstruse for their pupils.

SUGGESTED USES OF CARTOONS

For Motivation

By its nature an effective cartoon readily attracts attention and arouses interest. This suggests at once that appropriate cartoon materials can be useful motivation devices in the classroom. Cartoons on current topics, if suited to lesson objectives, are effective discussion starters. Such questions as "What does this cartoon mean?" "Does it tell the whole story?" and "What other cartoons have you seen on this subject?" can start the ball rolling quickly in a junior- or senior-high-school social studies class.

As Illustrations

One teacher reports effective results from using cartoons to illustrate scientific concepts in teaching science.[12] Some he uses to raise such questions as whether or not the situations pictured are scientifically possible or probable. Others illustrate drawing errors such as giving insects only two legs. Still others show the result of disregarding safe practices or the scientific method; this is done by asking the students what is wrong in the situation illustrated. This teacher emphasizes the necessity of selecting cartoons carefully so as to avoid purely humorous reactions among pupils on the one hand, and, on the other, pointless attention to details that are unrelated to the cartoonist's purpose.

Fig. 5.20. Cartoons may combine humor with illustrations of scientific principles.

A general science instructor might find the cartoon shown in Fig. 5.20 a vivid way to explain the role of friction in relation to movement.[13] Cartoons provide teachers with two valuable assets—good illustrations of significant learning points, and change of pace and variety in presentation of material to the class.

For Pupil Activity

Another type of cartoon use involves the creation of cartoons by the students themselves. Pupils make cartoons to enliven interest in cleanup campaigns and safety drives. The student council finds cartoons particularly well suited as reminders of courtesy, sportsmanship, and lunchroom behavior campaigns. Such devices, created by the pupils and containing the type of humor suited to their stage of maturity, are psychologically sound. They are likely to be effective even though inexpert in execution.

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[12] *Ibid.*

[13] John D. Wollever, "Using Cartoons in the Classroom," *School Science and Mathematics*, April, 1950, pp. 255–258.

Classroom production of pupil cartoons is likewise a useful activity. The social studies are a constant source of ideas suitable for cartoons. Literature and grammar also provide opportunities for drawing cartoons as illustrations of the knowledge acquired.[14] Fig. 5.21 shows a pupil-made cartoon that is directed at courtesy.

Be a Floor Hog!

Fig. 5.21. Social guidance is a natural field for the high-school cartoonist.

COMICS

Closely related to the cartoon is the comic strip.

The comics are very much with us. Estimates have placed the readers of comics in the United States at well over 100,000,000. Between 400 and 500 comic book titles are on sale, and some 95,000,000 copies are sold each month.[15] Translated into more than thirty languages, they are widely read in more than 100 countries. The immense popularity which comics have attained can perhaps be attributed in large measure to the need felt by millions of people of all ages for humor, gaiety, and entertainment. Whether or not educators and parents are inclined to approve of comics, all will agree that this medium of communication has become firmly established in our society.

DEFINITION AND CHARACTERISTICS OF COMICS

Comics may be defined as *a form of cartooning in which the same cast of characters enacts a story in a sequence of closely related drawings designed to entertain the reader*. Whereas the cartoon depends primarily upon a single visual impact, comics consist of continuing story situations in which reading plays an important role. Another distinction is the fact that comics are humorous, whereas the most unique and sig-

[14] Edith E. Mains, "The Cartoon and the Teaching of Grammar," *English Journal*, April, 1945, pp. 506–507.

[15] Paul A. Witty and Robert A. Sizemore, "Reading the Comics: A Summary of Studies and an Evaluation," *Elementary English*, December, 1951, p. 502.

nificant contribution of the cartoon is in politics and social problems rather than in entertainment.

Several other characteristics of comics should be recognized if the force of this medium is to be appreciated. Comics focus on people. The stories are personalized so that the reader can readily identify himself with the feelings and actions of the leading characters. The stories are brief enough to hold attention, they are packed with action, and in the Sunday supplement and the comic book they are made more vivid and appealing through the liberal use of primary colors.

HOW COMICS STARTED

Newspaper Rivalry

It is interesting to note that comics received their initial impetus from a newspaper war between William Randolph Hearst and Joseph Pulitzer in the mid-1890's. Colored supplements to the Sunday issues of the New York *Journal* and the New York *World* vied mightily with each other to build circulation.[16]

A significant part in this rivalry was played by funny drawings involving a character who came to be known as "The Yellow Kid." This sketch achieved rapid popularity and accordingly increased the circulation of Pulitzer's New York *World*. Within six months Hearst came out with a new comic section, ". . . eight pages of iridescent polychromous effulgences that make the rainbow look like a piece of lead pipe." Headlining his cast of characters was "The Yellow Kid," for Hearst had hired the original comic artist and his creation away from the *World*. Pulitzer promptly bought him back, but was again outbid by Hearst. Thereupon Pulitzer hired another artist and for a time both papers attempted to outdo each other with independent versions of the vulgar, raucous "Kid."[17]

The significant point of this anecdote is that the initial purpose of comics was to build newspaper circulation. In the process, comics became firmly embedded in the consciousness of the American public. It is worth noting that their purpose is still primarily commercial—to sell newspapers and comic books.

[16] Coulton Waugh, *The Comics*, Macmillan, New York, 1947, pp. 6 ff.
[17] *Ibid.*

Comic Strips

New comics were quickly created. "Buster Brown" and "The Katzenjammer Kids," the longest-lived of all comics, appeared by the close of 1902. With the Katzenjammers was introduced the play-by-play story told in a series of separate pictures with the same characters. Another artist carried forward the idea of using the same characters, added frame lines to the boxes, and developed an appealing comic-strip personality in "Little Jimmy." By 1905 the comics had acquired practically all the physical features which characterize them today—all, that is, except the format of the relatively recent comic book.

Comic Books

The comic book came into prominence in the mid-1930's. The lag between universal acceptance of the comic strip and the appearance of comic books on a large scale is curious, for early versions of the comic book had been used successfully as premiums in promotional campaigns as early as 1911.[18] Once the idea caught on, however, comic books developed rapidly into big business.

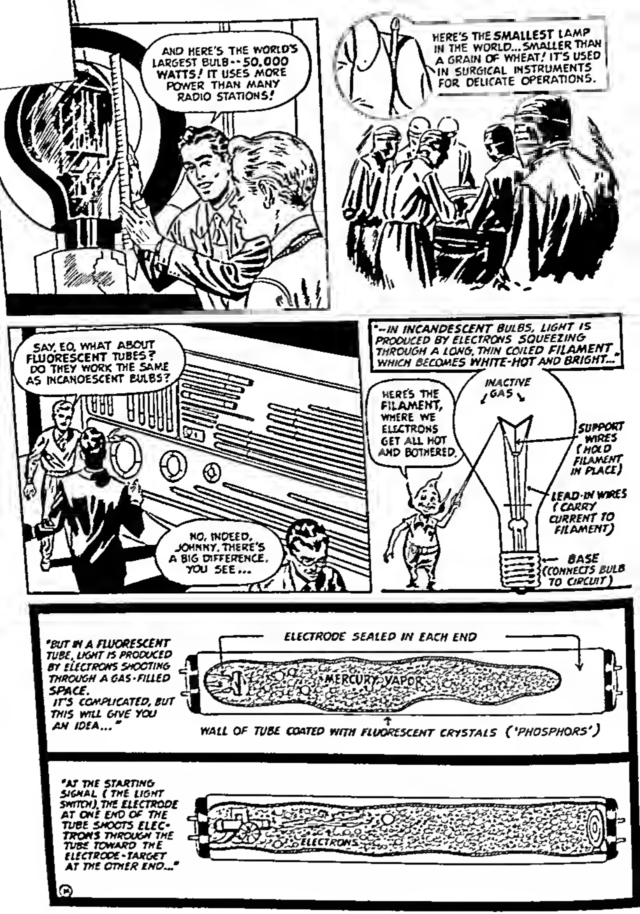
Numerous circulation studies have indicated that comic books are read almost universally by children in the intermediate grades, by nearly half of all high-school pupils, and by approximately one-third of our population between the ages of 18 and 30. By their junior or senior year in high school more than half the pupils stop reading comic books entirely or read them only occasionally. These studies merely substantiate what parents and teachers already know—that comics have become a major influence in the lives of American boys and girls.

USE OF COMICS IN INSTRUCTION

The extensive popularity of comics has led many teachers to experiment with this medium in teaching. Much of this experimentation has been done in the language arts at the intermediate and junior-high-school level, although similar experiments in science, history, the social studies, and even religious education are not uncommon. Fig. 5.22 shows comic techniques applied to information in the field of electric lighting.

An analysis of the language of the comics by Thorndike[19] indicated

[18] *Ibid.*, pp. 335–340.
[19] Robert L. Thorndike, "Words and the Comics," *Journal of Experimental Education*, December, 1941, pp. 110–113.



AND HERE'S THE WORLD'S LARGEST BULB--50,000 WATTS! IT USES MORE POWER THAN MANY RADIO STATIONS!
HERE'S THE SMALLEST LAMP IN THE WORLD... SMALLER THAN A GRAIN OF WHEAT! IT'S USED IN SURGICAL INSTRUMENTS FOR DELICATE OPERATIONS.
SAY, ED, WHAT ABOUT FLUORESCENT TUBES? DO THEY WORK THE SAME AS INCANDESCENT BULBS?
NO, INDEED, JOHNNY. THERE'S A BIG DIFFERENCE. YOU SEE...
"--IN INCANDESCENT BULBS, LIGHT IS PRODUCED BY ELECTRONS SQUEEZING THROUGH A LONG, THIN COILED FILAMENT WHICH BECOMES WHITE-HOT AND BRIGHT..."
HERE'S THE FILAMENT, WHERE WE ELECTRONS GET ALL HOT AND BOTHERED.
INACTIVE GAS
SUPPORT WIRES (HOLD FILAMENT IN PLACE)
LEAD-IN WIRES (CARRY CURRENT TO FILAMENT)
BASE (CONNECTS BULB TO CIRCUIT)
"BUT IN A FLUORESCENT TUBE, LIGHT IS PRODUCED BY ELECTRONS SHOOTING THROUGH A GAS-FILLED SPACE. IT'S COMPLICATED, BUT THIS WILL GIVE YOU AN IDEA..."
ELECTRODE SEALED IN EACH END
MERCURY VAPOR
WALL OF TUBE COATED WITH FLUORESCENT CRYSTALS ('PHOSPHORS')
"AT THE STARTING SIGNAL (THE LIGHT SWITCH), THE ELECTRODE AT ONE END OF THE TUBE SHOOTS ELECTRONS THROUGH THE TUBE TOWARD THE ELECTRODE-TARGET AT THE OTHER END..."
ELECTRONS

several points of interest. Perhaps the most significant of these is the finding that a child who reads one comic book per month will read approximately twice as many words per year as his reading book contains. Thorndike concluded that both the amount and the character of the vocabulary provided valuable practice io reading for the young reader.

The unique contribution of the comics as compared to that of printed text was investigated hy Sooes.[20] In an exploratory study with 400 sixth- and ninth-graders he used the comic magazine *Wonder Woman* as one approach to the life and work of Clara Barton. A printed text was used for his control groups. He found that mean scores among the picture groups ran from 10 to 30 percent higher on the first test. When the control groups were given the picture story, their scores on the second test improved significantly more than did the scores of the picture groups who were given the printed text. In summary Sones says, "In other words the picture groups seemed to have learned almost as much as they were capable of learning from their first reading while the groups reading the printed texts first had not reached the saturation point, but did so by a second reading in the picture form."

The teacher who uses comics in any of the curricular areas for which they are availahle will be aware of the need for applying sound principles of utilization. He will, for example, exploit the motivating potential of comic books in getting units off to a good start, hut he will not stop there (Fig. 5.23). Once interest has heen aroused, the picture story can be supplemented hy other reading materials, films, flat pictures, models, experiments, and a variety of creative activities. The principal merit of the comic book in instruction may be its capacity to create interest—interest, as teachers well know, that is essential to effective learning. If properly selected and incorporated in teaching methods, the comic can he an effective teaching tool.

Public Concern About Comics

The effect of undesirable types of comic books on children arouses public concern and action from time to time. As a result, several cities

[20] W. W. D. Sones, "The Comics and Instructional Method," *Journal of Educational Sociology*, December, 1944, pp. 238–239.

Fig. 5.22 The comic book technique can be applied to various fields. Here is an excerpt from a comic book on electric lighting.

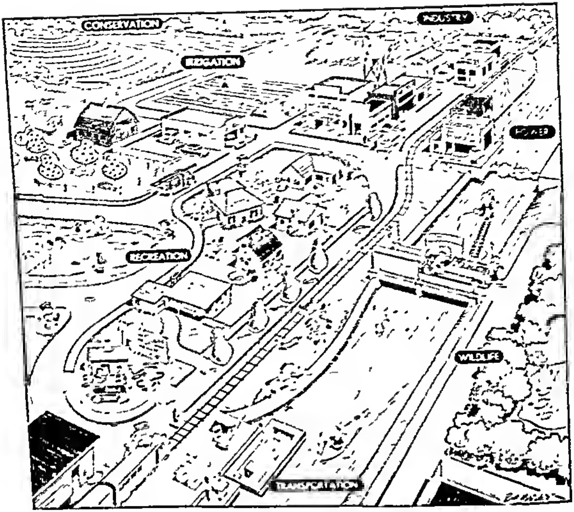


Fig. 5.23. Because of its wide appeal, the comic technique is often applied to serious explanations. In what classroom situations do you feel that the comic technique, used as in this explanation of water and its importance to us, is justified?

have barred such comics from sale at various times. Although a book by Wertham[21] called attention to the possible consequences of unrestricted reading of such comics, Witty and Sizemore's careful survey[22] of all the research in the field concludes that the views both of those strongly opposing and of those defending the comic medium are without substantiation.

Burton suggests the need for a wholesome attitude toward the constructive use of comics in instruction.[23] He quotes a statement by the

[21] Frederick Wertham, *Seduction of the Innocent*, Rinehart, 1954.
[22] Paul A. Witty and Robert A. Sizemore, *op. cit.*
[23] Dwight L. Burton, "Comic Books: A Teacher's Analysis," *Elementary School Journal*, October, 1955, pp. 73–75.

faculty of a school in Minneapolis which reflects a sound and constructive viewpoint regarding the teacher's role in this matter:

Those of us who hope to guide children's tastes and especially their reading interests must certainly take note that the comics are a form of reading each child takes to without coaxing. . . .

With adult guidance, comics may serve as a bridge to the reading of more lasting books. We must help our children discover good books that are exciting, too, and teach them to discriminate among comic books; then we may safely accept our children's comic reading for what it is,—a stage in their growth—, provided we also help them toward wider horizons of interest and appreciation.[24]

SUMMARY

Graphic materials may be defined as materials which communicate facts and ideas clearly and forcibly through a combination of drawings, words, and pictures. They are particularly well suited to the presentation of information in condensed summary form; the presentation of quantitative information as on graphs; the illustration of relationships as on charts, maps, graphs, and diagrams; and the representation of some kinds of abstractions as in cartoons, diagrams, and maps.

The types of graphic materials commonly employed in teaching include charts, diagrams, graphs, posters, cartoons, and comics. Each type has certain unique instructional applications.

Charts are combinations of various graphic and pictorial media designed to visualize relationships between key facts or ideas in an orderly and logical manner. Typical forms are the tree chart, the flow chart, and the tabular chart.

Diagrams are simplified drawings designed to show interrelationships primarily by means of lines and symbols. Diagrams are highly abstract and have a minimum of detail; hence they require a background of information before they can be used effectively with students.

Graphs are visual representations of numerical data. They show quantitative relationships more effectively than any other medium, but like diagrams, they require a background of experience and information to be effective as teaching devices. Typical forms are line graphs, bar graphs, and pictorial graphs.

[24] *Guide to the Teaching of Reading in the Elementary School*, Division of Elementary Education, Minneapolis Public Schools, 1950, p 130.

Posters are large-scale simplified pictorial illustrations designed to attract attention to key ideas, facts, or events. They are inherently simple and dynamic. Their function is primarily to motivate, arouse interest, remind, or advertise.

The cartoon is a pictorial representation or caricature of a person, idea, or situation designed to influence public opinion. Political cartoons are sources of information with a strong visual impact based upon sharp, compact drawings and humor of some type. There is some evidence that cartoons are chiefly valuable for teaching at the secondary rather than the elementary level partly because most commercial cartoons are prepared for adult readers.

Comics are a form of cartoon in which the same characters enact a story in a sequence of closely related pictures designed to entertain the reader. Although comics have achieved extensive popularity purely as an entertainment medium, certain materials in this category have definite educational values. Their extensive use of colorful illustrations, of a rapidly moving story, and of realistic people as characters appeals to students of all ages. Comic books are being used effectively by teachers to arouse interest, to develop vocabulary and reading skills, and to serve as springboards into broader reading interests.

Suggested Activities

1. Analyze typical units of work in your teaching field and prepare a list of points at which graphic materials would provide unique teaching values.
2. For a specific unit of work in your teaching field in which graphic materials are applicable, develop a lesson plan incorporating graphics, teach it, and report your results to your audio-visual class.
3. Divide the class into committees and have each committee select and evaluate the best examples it can find of one type of graphic material. Consider such points as (a) standards to be observed in selection, (b) sources of suitable materials, and (c) costs.
4. From the members of your class, obtain charts, graphs, diagrams, posters, and cartoons prepared by elementary and high-school pupils. Investigate the learning situation in each case and attempt to assess the educational values derived. Through group discussion formulate a set of principles which will be helpful in determining when and to what extent pupils should prepare graphic materials.

5. Make a committee survey of comic-book materials being sold at key newsstands in your community. Find which comics are best-sellers, which are objectionable (and why), and which are useful from an educational standpoint. Prepare suitable graphic materials for use in presenting your findings.
6. On the basis of the information secured for the preceding survey, draw up a P.T.A. program to consider the comic-book situation in your community. Plan the program so as to include both pros and cons in the discussion.
7. Have a committee of class members investigate sources of free or inexpensive graphic materials, prepare an exhibit of sample materials, and make classified lists of sources for distribution to your class.
8. Request members of the class to bring in and explain their use of graphic materials which they have found particularly helpful in their teaching.

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Sound Films

Action, B&W, 10 min., Library Films.
Animals, B&W, 20 min., Library Films.
Creating Cartoons, B&W, 10 min., Bailey Films.
Figures, B&W, 20 min., Library Films.
Funny Business, B&W, 18 min., McGraw-Hill.
Heads and Expressions, B&W, 20 min., Library Films.
How to Make a Silk Screen Print, B&W, 20 min., Almanac Films.
Language of Graphs, B&W, 13 min., Coronet Films.
Making a Serigraph, Color, 30 min., Harmon Foundation.
Of the People For the People, B&W, 14 min., Films of the Nations, Inc.
Poster Making: Design and Technique, Color, 10 min., Bailey Films.
Poster Making: Printing by Silk Screen, Color, 14 min., Bailey Films.
Silk Screen Process, B&W, 20 min., Library Films.
Silk Screen Textile Printing, Color, 11 min., Bailey Films.
Wet Mounting, Color, 10 min., Indiana University.

6.

The Study Display

THE PUPILS' SCHOOL WORLD IS CENTERED LARGELY IN THE CLASSROOM. This statement becomes more and more apparent as we observe school situations all about us. Since this is the case, the classroom must become a stimulating environment for learning. The walls need not be merely a means of holding the roof up, but may instead be a space for carrying study displays—arrangements of pictures, graphics, and three-dimensional materials which relate to the study goals being sought by the children. The ceiling area is not solely a ceiling but also a place from which to hang object displays of the solar system, the latest paper-sculptured models of aircraft, space platforms, rockets. The floor is more than a floor; it may become space for setting up study situations for understanding arithmetic and measurement; the blocks of tile, the angles at which chair and table legs meet the floor, the areas of the floor used for seating, work space, entrance, and exit—all may be used by the imaginative teacher as a means whereby curious-minded learners achieve specific study goals in arithmetic and science. Not only is the study display a useful learning experience, its value goes beyond this in helping to create an atmosphere or environment for learning.

Consider the pupil as he goes from classroom to classroom. Early in the morning he may attend a class in arithmetic. Next he goes to industrial arts and from there to a language class. At the end of the day he reports to the history room.

That student has many adjustments to make. His identification with arithmetic must be suddenly set aside as he leaves that class, and as he approaches the next class all his energies must quickly be concentrated on picking up the threads of another subject. It is desirable that as many

visible evidences of a given study situation as possible be reflected in the displays on walls, display boards, or bulletin boards in each classroom which the learner enters.

DEFINITION OF THE STUDY DISPLAY

The study display (bulletin board, tackboard, wall display, felt or magnetic board) is a device for displaying to learners graphic, photographic, or other study materials. It is used to present current classroom work in visualized form.

Study displays may include drawings, themes, diagrams, photographs, and three-dimensional objects, or any arrangements of these which are pertinent to the general areas of classroom study and learning activity.

The kind and amount of display space needed depends on the activity in progress. "Bulletin board or tackboard space can be used in almost any quantity by the most resourceful teachers. It should be light in color and durable; and all or most of it should be placed at the pupils' eye level. Part of the tackboard may become an easel, moved to a slight angle with the wall to facilitate painting and drawing. Occasionally a whole interior wall, or part of a wall, from floor to ceiling, is covered with soft wood and becomes an 'exhibiting wall' that encourages large group projects and display of pupil work."[1]

[1] National Council on Schoolhouse Construction, *Guide for Planning School Plants*, Nashville, 1949, p. 45.

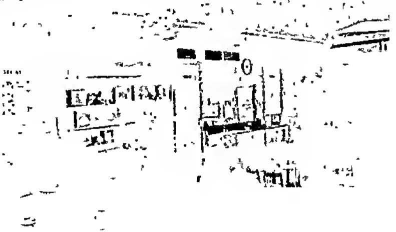


Fig. 6.1. How does this use of study display space relate to learning and achievement in this classroom? The corkboard area? The pegboard? The adjustable shelf area? The mural area? What kind of pupil-teacher planning does this imply?

FUNCTION OF THE STUDY DISPLAY

Too often the bulletin board or tackboard is used for no other purpose than to display announcements of forthcoming events, safety regulations, and other general information. Although this use is necessary, it must not be confused with the true teaching functinn of the study display.

The hall display case which frequently exhibits outstanding work done in health education, arithmetic, art, or the social studies is an essential part of the school's display work; but it should not be thought of as a functioning teaching display area.

Although all these types of display—the administrator's display, the observation of special events, and exhibits of individual class accomplishment—are an integral part of the school, the following discussion will concern study display techniques that are useful in the improvement of day-to-day classroom teaching situations. The goal will be to show that the *teaching study display* can become a valuable and integral part of learning activities in the classroom.

We shall see that the study display is an instructional opportunity which calls upon teacher and pupil alike for creative planning and ingenuity. Since the study display is a means of relating appropriate graphic materials to the subject currently being studied, it constitutes an opportunity to bring together useful pictures, graphs, comics, posters, charts, symbols, and related illustrative materials to supplement the current study activity.

LOCATING AND EQUIPPING STUDY DISPLAY AREAS

Even limited observations of classrooms in today's school buildings reveal too little space for bulletin boards or displays. The usual classroom is too often a clutter of doors and windows, service and ventilating outlets, and large areas of inflexibly installed chalkboards. Too often the study display area is relegated to out-of-reach locations above chalkboards or to poorly lighted space between windows.

This, of course, need not be the case. In tbe well-planned classroom a major part of the eye-level wall area is given over to study display space (Fig. 6.2). The best location for this display area is near or adjacent to the part of the room which is used as a workshop; this is frequently the rear of the room. The space should extend from approximately 30

VISUAL FIELDS

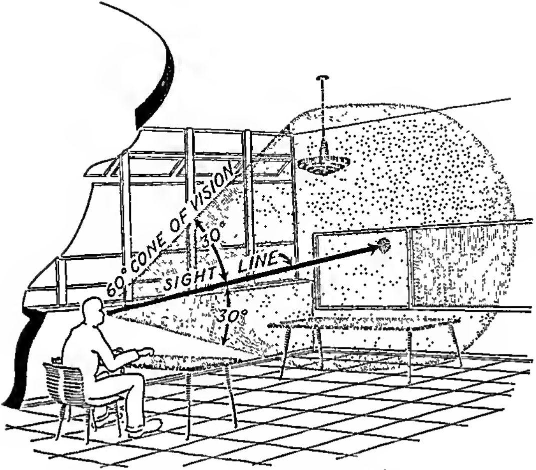


Fig. 62 The study display should be at the pupil's eye level.

inches above the floor to as high as the extended arm can reach easily. This will vary with the age of the child. In general, a display surface is of little use if it offers less than 3 feet of vertical working space. The horizontal dimensions are limited only by the size of the room.

Small bulletin boards—3′ x 4′, for example—are rapidly being discarded. Permanently installed *large* display boards should be an integral part of every classroom today. One very effective material for these boards is composition corkboard mounted on a heavy burlap-like backing for strength and retention of shape. This is available from commercial sources ranging from the local lumber supply company to school

supply distributors.[3] This or a similar material is installed in most classrooms as a permanent display surface.

Other materials useful for display areas include laminated wood or pressboard or pegboard. Wooden pins or bent wire display holders can be fitted into these surfaces as needed for the display. Magnetic chalkboards (see Fig. 3.10), as well as magnetic surfaces fabricated from ordinary metal window screening with small magnets used for the display material, provide flexible display surfaces for two- and three-dimensional objects.

Although some display space is provided in most classrooms, there are times when additional space is needed. Most teachers are concerned with how to provide this additional space. This can be done in any of several ways:

1. Unused wall or chalkboard areas can be hung with coarse, loosely woven cloth or strong paper suspended from a light but strong wire stretched along the top of the chalkboard. Cloth gives a good surface to "pin to." The heavy paper can be used as the "art paper" itself, the children drawing directly on it with crayon or pastel chalk. These temporary display surfaces can be easily restored to their original uses.
2. Small areas up to 4′ x 6′ can be converted to use as display areas by attaching to them soft wood, or a plywood veneer, which has been covered with an inexpensive, loosely woven, neutral-covered material. Cloth can be glued to the veneer; or if only a temporary surface is to be provided, the cloth can be stretched over the edges of the veneer and tacked lightly to the back with small tacks (see Fig. 6.3).
3. Cloth-covered pine-strip "grids" can be used when large areas are required for display purposes. The entire back wall of the classroom can be inexpensively converted in this way. White pine or some other strong but light softwood in 2″ x ½″ strips about 4′ in length is suitable. Arrange these strips in a grid which is spaced at intervals of 12 inches.

   Make the grid firm by driving two or three brads or tacks into the wood at each intersection. These grids can be covered with light cloth to improve their appearance. They can be moved easily from place to

[3] Beckley-Cardy Publishing Co., 1632 Indiana Ave., Chicago, Ill.; American Crayon Co., Sandusky, Ohio, New York Standard Blackboard Co., Inc., 144 W. 18th St., New York, N.Y.

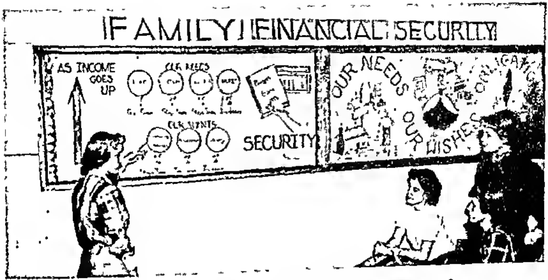


Fig. 6.3. This display area graphically summarizes important family budget information. Can you tell what simple materials were used in converting unused wall space in this way?

place, leaned against the wall, set upright in the chalk rail of the chalkboard, tacked to wooden moldings, or hung from a map rail or from hooks suspended from moldings.

Art materials, handwriting specimens, project pictures, and other study materials can be attached to this grid by means of thumbtacks or common pins.

PUPIL AND TEACHER RESPONSIBILITY FOR STUDY DISPLAYS

While the care and arrangement of hallway display cases, special-event bulletin boards, and administrative announcements can be organized on a calendar basis, with specific individuals responsible for specific dates, this is not feasible for the classroom teaching display. Because the subject matter of study displays is directly identified with classroom progress, and because most classroom responsibility revolves about the pupil, accountability for planning and arranging these learning devices should be placed as directly as possible on pupils or pupil committees.

Individual pupil interest, initiative, and responsibility are the true bases for study display area activities. The child who likes to "comb" newspapers and magazines for information relating to subjects currently

being studied should be encouraged and should be on the current events display committee.

The child who is artistically inclined, who is interested in color, design, and form, should be an effective member of the bulletin board planning committee. This group can mount pictures, prepare original diagrams, etc. Pupil ability and interest may give clues to participation on other committees. The teacher who knows the interests and capacities of individual pupils and correlates these with the opportunities presented by study display work is creating opportunities for better expressions of pupil initiative.

A group of teachers in Wilmette, Illinois, devised a method of maintaining an accumulating file of study pictures. Each teacher was given a metal file in which study materials were stored under appropriate subject and unit headings. This file provided ideas for bulletin board arrangements. If key materials are put on the display board and a portion of it is left blank, few pupils will fail to respond to the challenge the blank space offers. After the teacher talks about completing the display, the children will hunt everywhere for interesting things to add to it. No teacher should expect that his pupils will be ready-made creators of study displays.

DISPLAY SUPPLIES

Needed supplies for display work should be available in every classroom. These include artcraft paper, rolls of plain brown wrapping paper, pastel chalk, wax crayons, water colors, wire, tacks, pins, Bulletin Board Styx,[3] and oiled paper for use as stencils.[4]

Additional supplies include three-dimensional cardboard and ceramic letters. Words and phrases can be formed with these letters.[5]

ARRANGING THE STUDY DISPLAY

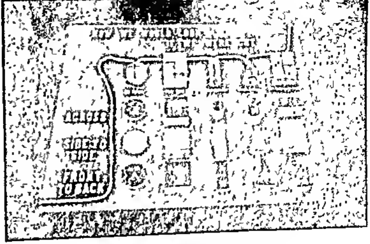
Although no one wants to follow the same plan in arranging displays, certain basic principles of display arrangement may be stated. Each

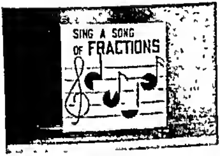
[3] Bulletin Board Styx, Lea Audio-Visual Service, Albert Lea, Minn.

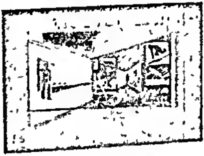
[4] See Source Lists, pp. 542–543.

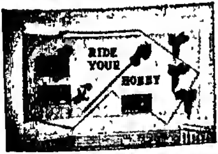
[5] Redikut Letter Company, 2902 W. 70th St., Los Angeles, Calif.

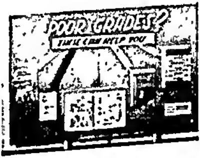
Opposite page: Here are eight study displays. Examine them carefully. To what extent do they observe the four criteria of effective arrangement and use of color listed on page 157? In which of these displays is color used to demand attention, to communicate factual information truthfully, or as an aesthetic factor?

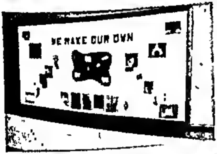



SING A SONG
OF FRACTIONS




RIDE
YOUR
HOBBY


POOR GRADES?




red
yellow
blue

teacher-pupil group should consider these, but apply them as their particular needs indicate.

1. State the purpose of the display. Give it a name, a headline. This heading should state the central idea. Be dramatic. Ask a question, pose a problem, make a direct claim or statement.
2. Visualize the display. If the subject can be described graphically, the display is the place to do it. The pictures, graphs, diagrams, or models used in it should all help to bring about further understanding of the central purpose of the display.
3. Arrange the parts of the display dramatically and attractively. Take a cue from modern magazine and newspaper layout.[6] Use attractive groupings. Have plenty of open space. Avoid a "rank and file" mounting of pictures or objects.
4. Use color when color is clearly needed to bring out the truth of what the study display is to communicate. Also use color when it will attract the learner's attention and interest in the content of the study display.

   The use of color in study display situations has at least the three following purposes:

   a. To dramatize or focus attention on key items or relationships. Intense colors virtually demand the attention of the viewer. Study displays involving rules, directions, steps in a process, time lines of important dates in history, etc., will profit from the judicious attention-demanding use of colors which help classify or differentiate.
   b. To portray visualized information with truthfulness. Scenes, costumes, persons, and geography and science objects which have color in real life demand the use of color when presented in a study display. Thus a study display designed to portray wild life effectively must of necessity be shown in its natural and authentic colors. Similarly, displays involving architecture, costumes, and geographical settings should be shown in natural color if the full truth about them is to be communicated to the learner.
   c. To heighten interest. Study displays are more likely to attract attention when color is used as part of the design, that is, when pleas-

[6] For further and more detailed discussion of layout, see pp. 133, 236.

ing combinations of colors (see color wheel facing page 217) are used in a decorative way for backgrounds, for frames for the graphies in the display, etc. Displays set off against warm complementary colors usually appeal to the learner's aesthetic sense and help interest him in further study of the display.

Color wisely used is an important consideration in the content and arrangement of effective study displays. Good judgment and common sense are the teacher's best qualifications for using color intelligently in creating effective study displays. (See plate facing page 156.)

STUDY DISPLAYS THAT TEACH

Teaching study displays fall logically into three general categories: those which motivate, the work type, and those which represent the cumulative efforts of the class group.

STUDY DISPLAYS WHICH MOTIVATE

In arranging a motivational display, the teacher will often find it necessary to locate most of the materials himself. These may be secured from such sources as school library files and his own classroom file of key subject materials mentioned above. The goal is not to present a ready-made or complete display, but to arouse interest. At first the contents of the display may be largely a collection of work done previously by pupils and teachers.

A secondary-school art instructor displayed the actual objects which constitute the working tools for one kind of art activity. They were attached to the display surface with a mastic material, such as Bulletin Board Styx, which offers untold new opportunities in creating attractive, attention-arresting wall displays.

This three-dimensional exhibit (see Fig. 6.4) included inks, wax crayons, cutting tools, hacksaw, pens and penholder, showcard pigments, and basic artcraft paper, all of which were to be used in actual classwork. Above them was the simple question, "What can you make with these?"

Needless to say, after some preliminary discussion, most of the students had many ideas about what they wanted to do. First, of course, they had to learn to manipulate the materials; but they were motivated.

Several days before beginning a junior-high-school unit on the petroleum industry, a teacher put up on the display board several pamphlets

Fig 6.4 Actual three-dimensional materials, in this case art supplies, can create an intriguing display which is both interesting and informational.

and actual three-dimensional sample bottles of petroleum products. He asked the pupils: "Will you be on the alert for more interesting material, pictures, etc., about petroleum? If you find anything interesting, will you bring it in?" The students were interested—so much so that before the unit began, news clippings, additional specimens, and pictures of petroleum products and the petroleum industry were brought in to supplement the core display.

A high-school mathematics teacher periodically posted a single but unusual problem which was displayed diagrammatically. These problems never failed to attract a knot of curious students, who would be pondering such a question as: "Which of the one-pound candy boxes would require the shortest length of ribbon to tie it once around each side?" In this case, three beribboned boxes of varying size but identical volume were attached to the board below the question.

A science teacher posted a vocabu-

Fig. 6.5. These three motivational displays illustrate how questions and well-balanced arrangements of pertinent materials can arouse the curiosity of the learner so that he will find things out for himself.

Fig 6.6. This student-arranged display aroused interest in the United Nations.

lary list each week. Beside this list he put cutout magazine illustrations so that students could match words and pictures—a combined picture-dictionary, so to speak. A primary-grade social studies teacher mounted photographs relating to the wildlife in far-off places, thus capitalizing on an opportunity to arouse the curiosity of young learners.

It is natural to respond to a challenge. In the case of the motivational study display, however, the challenge should be appropriate. The three motivational study displays pictured in Fig. 6.5 illustrate appropriate challenges which are within the interest and ability of the learners for whom they were designed.

The display, "Do you know this country?" invites the learner as well as you, the reader, to apply the readiness experience you already have to the problem of identifying the "silhouette" country and recognizing where the three-dimensional objects occur in the combination shown. It says to all who see it: Do you know this country where rubber trees and sprigs of white pepper can be found? You would walk closer to look at these objects and "feel" their texture. As a learner you might leave this display a little more interested in reading and talking about Thailand.

The display which asks, "Machines help us—How?" is a natural way of getting young science learners to think about a new subject in terms of their present-day readiness experiences with simple machines. The child who knows about clothes pulleys, hammers, and wagons is ready for well-channeled curiosity to lead him to study of the simple machines represented in this display.

A civics teacher who anticipated difficulty in capturing the imagina-

tion of her ninth-grade class for a thoroughgoing study of the United Nations sought the help of interested students. They arranged a display that was studded with questions about the United Nations and that immediately caught the interest of the class as a whole. This display is shown in Fig. 6.6.

The motivational display board can become an "open sesame" to new areas of information that are eagerly sought by students. Its possibilities are limited only by the imagination of the teacher.

THE WORK-TYPE DISPLAY

The work type of display is of the greatest value when undertaken initially by the pupils and kept up continuously hy them. These displays should be directly related to the children's progress as the class passes on to the various stages of the learning process.

The work-type display may begin with actual study materials and

Fig. 6.7. How may a work type display like this one become a measure of sought-after learning outcomes?

proceed through the trial-and-error formulation of procedures, questions for study, and techniques for continuing the search for information. This type of display is always closely allied to general work progress.

The experience chart and mural display in Fig. 6.7 reveals the extent to which the day-to-day work-study progress of these primary-grade pupils fulfills goals in reading, vocabulary, concept understanding, creative art, and language arts. Work-type study displays can become evaluation experiences. Thus the display shown here measures the degree to which basic readiness experiences have resulted in creative writing and in reading comprehension. When children are able to create an accurate and understandable mural about turtles and their habitat, when they write or dictate an experience chart, when they discuss their learning outcomes, the display chart thus produced is a true measure of accomplishment. It is hard to describe the point at which a work-study display becomes a culminative display, nor is the distinction worth much attention. It is important, however, to describe carefully the role both may have in stimulating the processes of useful learning.

At the primary level, displays built around nouns, action words, and colors offer incentive and pride of achievement to the young learner. The work-type display is most effective when it gives evidence of ideas and information which are closely related to or actually grow out of the subject being studied.

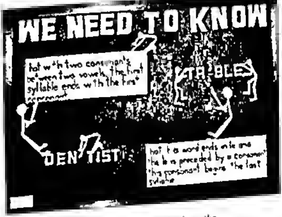


Fig 6.8 In this work-type display the "rules" can be changed from day to day. What ideas do you have for drill displays in arithmetic, algebra, spelling, science, foreign languages?

An area of classroom experience which is inevitably of concern to the teacher has to do with possible techniques for the motivation and improvement of drill situations. There is a continuing need for drill, particularly in arithmetic and mathematics, language arts, the social studies, and history. The work-type display has an important part to play in dramatizing and heightening interest in drill situations.

Fig. 6.8 demonstrates how drill information in language arts was made

the

Fig. 6.9.

the subject of an attractive and interesting display. "We need to know" rules were dramatized. The rules were put on cards which were changed at intervals of a day or two; the class discussion of them determined how often they were changed. The cutout stick figures were changed or not, depending on whether they were appropriate to the new rules and words.

Similarly, arithmetic rules, geometry theorems, and other drill materials can be made the subject of study displays. At first such displays would have to be arranged by the teacher. As soon as possible, however, interested and able pupils should assume responsibility for knowing the rules and then arranging displays that will explain them to their classmates.

In language arts situations, study materials such as newspapers, magazines, maps, charts, and wall displays supplement one another as the children seek to interpret the news in terms of geographical areas and social groups. In Fig. 6.9, junior-high-school pupils are collecting materials and doing simple background research work for the "data" around which a "newscast" on events of the day will be built.

When the work-type display is used to record class progress, the

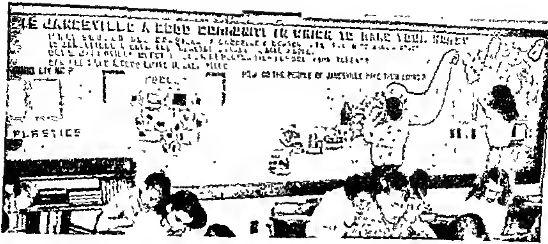


Fig. 6.10.

group's decision on the main problem to be studied may be prominently displayed on the board. As subproblems are developed in class discussion, they also are included. Evidence of the continuing search for information in books, periodicals, audio-visual materials, interviews, etc., can be systematically added. The display in Fig. 6.10 is a cumulative but not yet complete record of the progress which this class has made.

The work-type display can be used whenever motivation can be developed—in any classroom situation, at any level, and in any subject. Display areas can be expanded, if necessary, by using another wall area temporarily. This type of display can become an integral, closely associated record of progress of the day-to-day work done in the modern classroom.

THE CULMINATIVE STUDY DISPLAY

The culminative display "pulls together" the work accomplished over a period of days or weeks; it summarizes the end products of a unit of work. Any good workman wants to see the end result of his labors. It is in this capacity that this type of display serves as a summarizing, evaluating, or concluding record of the work done.

In a junior-high-school class the motivational activities revealed a need for information about soil erosion. In order for the pupils to understand erosion, certain subquestions had to be included. It was necessary, for example, to know about the action of wind, water, ice, snow, and sun on the earth's crust. After days of study, information gained from many

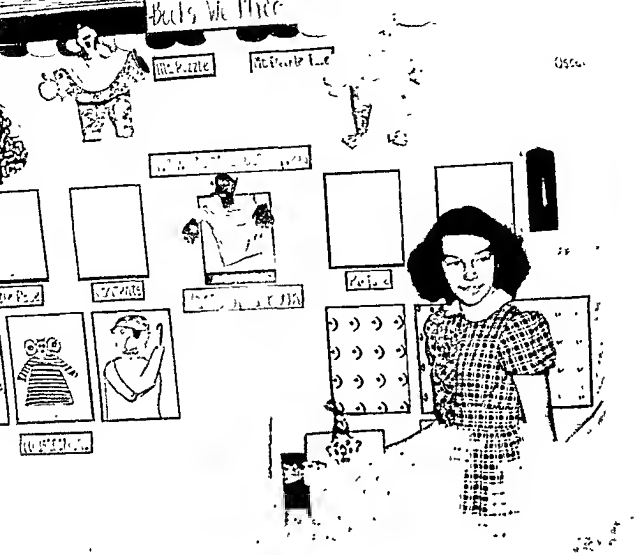


Fig. 6.11.

sources was brought together. Answers to initial questions were put on the display as a culminative activity. A mural was prepared as a coöperative effort, each child recording his answers to the particular problems of erosion into which his interest had led him.

A study of books and printing naturally led sixth-grade children to gather information in allied fields. They wrote, illustrated, and finally bound a "book" of their own about a family of puppets. How they did this was told in display form (Fig. 6.11).

How do people of other lands live? What effect do animals have on the lives of people who live in various climates? The opportunity to show these relationships led an entire class to collect information and materials for a display, each in terms of his own interests.

The degree to which all the children participate will depend on indi-

vidual ability. However, unless everyone contributes in some degree, the display activity cannot be carried to its highest level of development. A good classroom study display represents the entire group's thinking, planning, and developing.

SPECIALIZED STUDY DISPLAY DEVICES

Teaching displays may be arranged in a variety of ways on a variety of surfaces. Traditional means for classroom display include tackboards, presswood bulletin boards, panels mounted above the chalkboard—all fixed or built-in areas for display. The teacher may devise temporary display surfaces; this was discussed on page 154. In addition, other display surfaces may be used—the feltboard, and other adhering boards.

THE FELTBOARD

The fact that hair, wool, and cotton felt or flannel will adhere to like surfaces has long been used in classroom work. Today a feltboard, either homemade or produced commercially affords a splendid opportunity for the enrichment of classroom teaching techniques.

A feltboard is a felt-covered flat surface. In making a feltboard, felt is stretched and then glued to wood veneer, pressboard or Masonite, or heavy cardboard. Letters, words, and

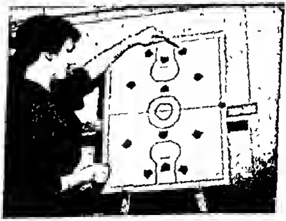


Fig. 6.12. The feltboard encourages the use of words, objects, and symbols in developmental or "explain as you visualize" study displays. This allows rearrangement, discussion, and review.

Fig. 6.13. Adhering boards encourage both teacher and pupils to develop their own visual explanations of new learning tasks.

cutouts made from felt, when placed on the board, will stay in place because of the adhering quality of felt for felt.

The materials used on the feltboard may be secured from commercial sources, as was the vocabulary in Fig. 6.12. The alternative is to make your own. By combining cutout figures taken from a children's magazine and left-over pieces of bright-colored cotton or wool felt, the teacher in Fig. 6.12 has visualized a safety story. As she told the story, she established the setting for the episode, the street intersection, at just the appropriate time by spreading two strips of cloth across the feltboard. Next the action began—safety bear and careless bear "arrived" and each met his just reward as he was careful or careless in crossing the intersection.

Fig. 6.12 shows that the use of the feltboard is as broad as the ingenuity of the teacher. The opportunity to build up a situation, to create suspense, to repeat or alter situations is entirely in the teacher's hands as he gains experience in the myriad ways the feltboard may be used as a supplementary teaching device. In situations where progressive explanations, the use of color to identify symbols, and visualization will lead to understanding, it is extremely effective. The chemistry teacher who uses it for visual explanations of molecular arrangements, the physical education director who uses quickly movable varicolored symbols to explain complex defensive and offensive strategies in various games are using feltboard teaching opportunities wisely and effectively.

OTHER ADHERING BOARDS

Anyone who has observed children's interest in manipulating things will be interested in some of the current display techniques, three of which are shown in Fig. 6.13—the flannaroll screen, which is a kind of feltboard that rolls up like a screen for storage and protection when not in use; the Match-a-tach device, which enables the use of magnetic materials in study situations, language arts, vocabulary, number readiness, etc.; and the Playmaster, also a magnetic device that is useful for coaching the various sports.[7]

EVALUATING THE STUDY DISPLAY

Study displays are the outgrowth of the need for visualizing the initial steps, progress, and final achievement in classroom activities. Because of their importance in teaching situations, the creation of displays is likely to be time-consuming. In order to make sure that the expenditure of time for this purpose is commensurate with teaching outcomes, both pupils and teacher should critically evaluate the study display in terms of its effectiveness as an experience in learning.

Study displays must be useful in the teaching process. Regardless of the care and effort that have gone into them, they should be dismantled once their usefulness is past. Display techniques should be constantly under scrutiny, and opportunities for improvement continuously sought. Lettering, phrasing, clever arrangement should all be considered when the study display is evaluated.

The following evaluation scale is suggested as a measuring instrument which can be used by teacher and pupil in answering the question, "Has our classroom study display been effective in helping us become interested and effective in doing a given unit of work?"

Display Content

1. Did the information on our display help us in our study of the subject we were pursuing? Yes .... No ....
2. Did our display bring us information beyond what we could have got through more accessible, more easily available channels? Yes .... No ....
3. Was our display planned and executed by all of us to the maximum degree possible? Yes .... No ....

[7] See Source List, pp. 542–543.

4. Were all the pupils encouraged to help in the creation of the display, each in terms of his own interest and ability to contribute? Yes .... No ....

Mechanics

1. Is our classroom equipped with modern display devices (Fig. 6.14)? Yes .... No ....
2. Were attractive headings, captions, phrases, etc., used to identify display objects and illustrations? Yes .... No ....
3. Was the display artistically balanced? Yes .... No ....
4. Was it uncluttered? Yes .... No ....
5. Was it organized around a focal point of interest? Yes .... No ....

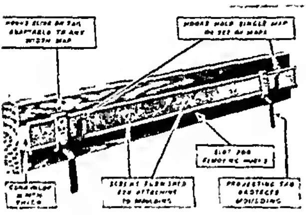


Fig. 6.14. Adequately equipped classrooms encourage pupil-teacher display attempts. This chalk rail holds string loops, charts, maps, etc.

6. Were strings or tape, arrows, or other directional devices neatly and carefully placed? Yes .... No ....
7. If humor was possible, was the cartoon technique used? Yes .... No ....
8. When photography was possible, was it used? Yes .... No ....

For the Teacher

1. Do I maintain a file of photographs and other valuable pupil-created material for future use in motivational displays? Yes .... No ....
2. Are the basic display materials—colored paper, tape, pins, mastic materials, etc.—readily available to my pupils? Yes .... No ....
3. Have I drawn a simple layout of a good display to be filed under the appropriate unit of work so that a year from now I can improve on it as my pupils and I discuss means for preparing display work? Yes .... No ....

SUMMARY

A study display is a device for the classroom display of graphic materials which are closely related to the interests and study responsibilities of learners.

Display surfaces may be commercially produced corkboard, softwood, pressboard, veneer, etc. Temporary surfaces may be improvised from wooden grids covered with cloth or coarse wrapping paper. To be effec-

tive, the display should be placed at eye level and offer a large expanse of working space.

More important is the use to which the display is put. It is best used as a surface on which pictures, specimens (flat and three-dimensional), examples of student work, and all other kinds of related graphic study materials may be shown in the classroom.

Graphic study materials which are interesting, descriptive, and clarifying and which supplement other information sources closely related to classroom activities can be arranged in one of the following ways:

1. The motivational study display, which asks questions, presents problems, exhibits pictures, photographs, or specimens of unusual objects, or otherwise presents situations which attract learners and arouse their curiosity.
2. The developmental study display, which records pupil planning and progress. This display offers wide opportunity for pupil initiative and responsibility. Its content may range from brief statements of plans to pictorial or other graphic evidence of progress in a unit of work or the solution of a problem.
3. The culminative study display, which presents a complete graphic record consisting of charts, explanations, photographs, pictures, models, and specimens. The visualized outcomes of a completed study problem or project may be organized in such a display.

Arranging pictures into artistic groups, mounting three-dimensional specimens or models skillfully, using clever attention-arresting headings and colors, etc.—all are part of creating an effective study display.

The study display should not be a teacher-dominated classroom project; rather it should be the outgrowth of pupil-teacher planning. It should reflect a maximum of pupil initiative and creative participation.

Suggested Activities

1. Arrange to view such how-to-do-it films as the following. Then try out the suggestions you got from the films.
   a. *Bulletin Boards: An Effective Teaching Device*, Sound, Color, 11 min., Bailey.
   b. *Bulletin Boards for Effective Teaching*, Sound, Color, 10 min., Iowa State University.

c. *The Feltboard in Teaching*, Sound, Color, 10 min., Wayne University.
d. *Flonnelgroph*, Sound, Color, 27 min., University of Minnesota.
e. *Lettering Instructional Materials*, Sound, Color, 20 min., Indiana University.
f. *Paper Sculpture*, Sound, Color, 6 min., International Film Bureau.
g. *Techniques of Poper Sculpture*, Sound, Color, 10 min., Allen-Moore.
h. *Wet Mounting*, Sound, Color, 10 min., Indiana University.

2. Begin to accumulate a file of photographs, diagrams, illustrations, specimens, etc., which will be useful in creating motivational study displays for the subjects you teach or will teach.
3. Help pupils plan and make a study display. In terms of known pupil interests and abilities, help small groups of children define how they will locate materials for the display. Organize such committees as these (if they are appropriate):
   a. Specimen collectors.
   b. Picture locaters and mounters.
   c. Caption makers.
   d. Diagram drawers.
   e. Original artwork creators.
   f. Reading researchers and authenticators, etc.
4. Visit your colleagues' classrooms. Examine study displays and judge their effectiveness, using the evaluation form on pages 169–170. Sketch roughly those you feel are outstanding; give reasons for your judgment.
5. Offer to provide additional temporary display space in a classroom which needs it. Ask the manual arts teacher or the building custodian for light 2" x ½" lath, or assemble simple materials and construct a grid-type display board.
6. Plan and actually arrange a study display of the motivational, work, or cumulative type.

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7.

c. *The Feltboard in Teaching*, Sound, Color, 10 min., Wayne University.
d. *Flannelgraph*, Sound, Color, 27 min., University of Minnesota.
e. *Lettering Instructionol Moterials*, Sound, Cnlor, 20 min., Indiana University.
f. *Poper Sculpture*, Sound, Color, 6 min., Internatinnal Film Bureau.
g. *Techniques of Paper Sculpture*, Sound, Color, 10 min., Allen-Moore.
h. *Wet Mounting*, Sound, Color, 10 min., Indiana University.

2. Begin to accumulate a file of photographs, diagrams, illustratinns, specimens, etc., which will be useful in creating motivational study displays for the subjects you teach or will teach.
3. Help pupils plan and make a study display. In terms of known pupil interests and abilities, help small groups of children define how they will locate materials for the display. Organize such committees as these (if they are appropriate):
   a. Specimen collectors.
   b. Picture locaters and mounters.
   c. Caption makers.
   d. Diagram drawers.
   e. Original artwork creators.
   f. Reading researchers and authenticators, etc.
4. Visit your colleagues' classrooms. Examine study displays and judge their effectiveness, using the evaluation form on pages 169–170. Sketch roughly those you feel are outstanding; give reasons for your judgment.
5. Offer to provide additional temporary display space in a classroom whi[ch] needs it. Ask the manual arts teacher or the building cust[odian] ...ported 2" x ½" lath, or assemble simple materials and construct ... board.
6. Plan and actually arrange a study display of the m[...] cumulative type.

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Bibliography

As he plans his campaign for a new bond issue, the city superintendent of schools makes extensive use of census plot maps to show population trends in the community, what parts of it have had the most new babies during the past five years, and where needed new school buildings should be located. . . .

You can readily think of other day-to-day illustrations of map use both

Fig. 7.1. The jet age and some of its implications are suggested by this use of a map. The figures indicate approximate flying time by jet transport over great-circle routes from a central point in the United States.

7.

HAVE YOU MADE YOUR VACATION PLANS?" ASKED THE TEACHER OF HIS fifth-grade class on a late spring day.

A flurry of hands shot up.

"I'm going to camp!" said one.

"We're driving to Yellowstone Park," volunteered another.

"My dad wants to go to the Lake of the Woods and fish, but I think we're going to the Gaspé Peninsula instead," said a third.

Out of the enthusiasm of anticipation a series of useful writing, reading, and storytelling activities quickly developed. Location of destinations and routes of travel brought into use a map of the state, another of the United States, and a number of road maps as the students re...

2" x ½" lath, or assemble simple materials ...

board.

6. Plan and actually arrange a study display of the m... cumulative type.

Bibliography

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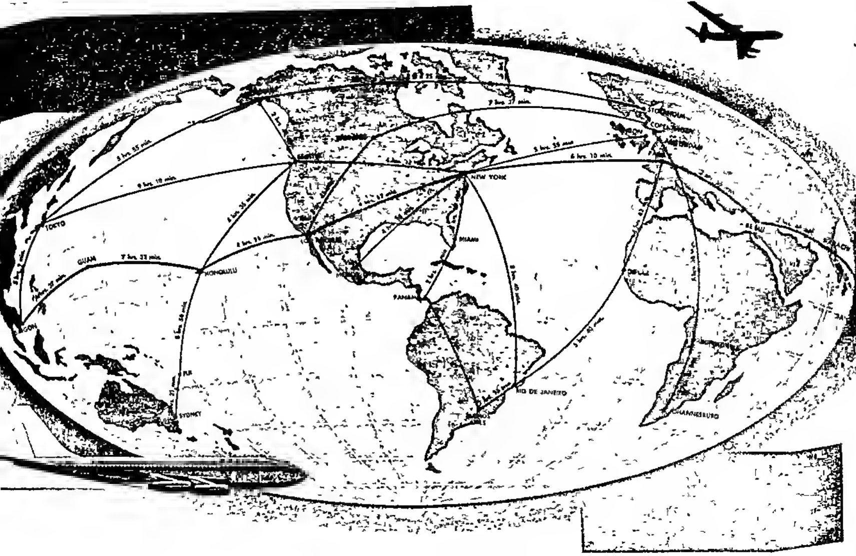

NEW YORK
TOKYO
GUAM
HONOLULU
SYDNEY
MIAMI
RIO DE JANEIRO
STOCKHOLM
COPENHAGEN
9 hrs. 10 min.
5 hrs. 55 min.
6 hrs. 10 min.
7 hrs. 37 min.
7 hrs. 33 min.

in aod outside of school. Maps of many kinds have become increasingly importaot media of communication in our daily lives as well as in our efforts to understand better the world in which we live.

We are gradually adjusting ourselves to the fact of a smaller world. The "isolationism" of a few years ago is less evident than it was. Planes flying overhead day and night are a constant remioder that once-distant cities and countries are only bours away from us wherever we may be. (See Fig. 7.1.)

This awareness places a premium on a new kind of understanding of our world neighbors and of the lands they live in. This is the challenge faced today by every teacher in every classroom in our country. It requires, among other things, that every student acquire a functional knowledge of maps and globes because they are fundamental to a real understanding of other lands and peoples. In coosequence, teachers nced to become thoroughly familiar with the language of maps in order to teach and interprct them effectively.

CHARACTERISTICS OF GLOBES AND MAPS

Two general observations should be made with respect to the nature of globes and maps before we consider them individually in some detail. The first has to do with their relative accuracy; the second deals with the abstract character of both.

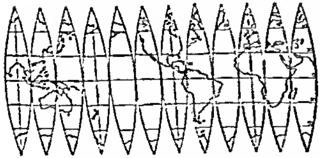


Fig 7.2. When gores are removed from a globe and flattened, they look like this.

RELATIVE ACCURACY

Globes are spherical models of the earth. Since the earth itself is a sphere, globes are the most accurate maps we have of the world as a whole.

Maps are flat representations of the earth's surface. Because the earth's surface is spherical, a flat representation of any large portion of that surface involves difficulties. These are well illustrated if you attempt to flatten out a half grapefruit shell or half of an old rubber ball. It can be done only by hreaking or compressing the surface. This is the problem the map maker faces. Accordingly, one char-

acteristic of flat maps is the presence of certain unavoidable inaccuracies.

When the surface of a globe is divided along the meridians, the resulting sections are called "gores" (Fig. 7.2). On any flat map the spaces between these gores must be filled in or the gores stretched in snme manner so as to avoid gaps in the map surface. When this is done, area distortion results.

The farther the distance north or south from the equator, the greater is the spread between the gnres. Hence the farther north or south we go, the greater are the inaccuracies on a flat map. Thus the Mercator projectinn shown in Fig. 7.3 exaggerates considerably all areas above 50 degrees north latitude.

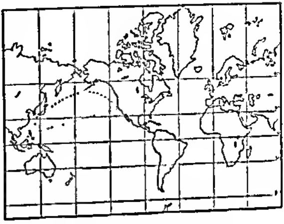


Fig. 7.3 Note how Greenland compares in size with South America on this Mercator projection. The curved dotted line is the great-circle route, the shortest surface distance from the Philippines to San Francisco

Because any straight line on it can be used as a compass line, the Mercator projection is valuable for navigators. But for school purposes it is likely to be misleading with respect to the actual size of land and water areas. For example, Greenland appears to be larger than South America (Figs. 7.3 and 7.4).

These inaccuracies are significant, for school purpnses, only on maps of large areas. We will discuss this in more detail in relation tn map selection. Meantime let us note another general characteristic of globes and maps.

ABSTRACT CHARACTER

Globes and maps are by nature abstract. Their language is nne of symbols, lines, colors, names, and space relatinnships. A dot, for example, fixes the location of a city. A line of one type means a highway; another represents a political boundary such as a county or state; still nthers designate rivers, railroads, trade routes, elevation contours, natural boundaries between water and land, direction, and other similar features.

Usually these symbols on a map have little visual resemblance to what

they represent. Sometimes, as in the case of parallels, meridians, and contour lines, they represent things that cannot actually be seen anywhere on the earth's surface. Hence, in order to read maps and globes successfully, we must be able to interpret many symbols and colors.

Color helps to make a map readable, but the colors used are different from those in nature. Since it is obviously impossible to show the actual colors of land and water surfaces as they vary with season, vegetation, rainfall, location, and other factors, the cartographer must assign somewhat arbitrary meanings to the colors he uses.

Fig. 7.4. Here is the Mercator projection of Greenland and South America. To the right, in correct scale, is Greenland. Comment on the accuracy of these three representations.

GLOBES

A spherical map on a globe is the only true map of the earth because the earth itself is a sphere. In actuality, the earth is not a perfect sphere, but the divergence is so slight as to make no practical difference. The diameter of the earth at the equator is 27 miles greater than its north-south diameter at the poles. This 27 miles is one-third of 1 percent of the earth's diameter. On a 10″ globe the difference amounts to less than half the thickness of a dime, a difference which no eye can detect. Thus for any but the most highly technical purposes, the earth may be described as a true sphere.

The surfaces on most globes are printed as flat gores. When they are being mounted on the sphere, these gores are stretched slightly so that they will fit together properly on the spherical surface. Thus, if one "peeled" a globe he would be unable to flatten out the sections any more successfully than he could in the case of the grapefruit shell. A film entitled *Impossible Map* illustrates this interestingly and effectively.[1]

TYPES OF GLOBES

Globes vary in both size and type according to function. The size is usually expressed in terms of length of diameter, the most common sizes

[1] *Impossible Map*, 16 mm., Sound, Color, 10 min., National Film Board of Canada.

Fig. 7.5. This plastic inflatable globe is one attempt to solve the problem of the cost and fragility of good globes. This one is unbreakable and weighs less than two pounds.

being 8, 12, 16, 20, and 24 inches. The 8″ globe is suitable only for individual study; the 12″ and 16″ globes are most frequently used for group or class purposes. Slated or project globes in the 20″ and larger sizes are also being used widely in schools. A plastic globe which can be inflated like a balloon is shown in Fig. 7.5.

Other factors being equal, it would be highly desirable for all globes to be large enough to be seen readily by an entire class. However, the prohibitive cost of hand-covered globes larger than 16″ and the great amount of space taken by a globe large enough for an entire class to see, are factors which have prevented the use of larger globes in most school systems. A noteworthy exception is found in some schools in which teachers and pupils have constructed large globes of their own. An example of such a globe is shown in Fig. 7.6.

Three principal types of globes are valuable for school use: political globes, physical-political globes, and slated outline globes. A simplified political globe with a minimum of details is desirable for the primary grades. If globe and wall maps have identical colors, this type of globe can be particularly helpful in the transition to political flat maps later on.

Physical-political globes should be introduced at the intermediate level and used at all levels above the primary grades.[2] A color system is usually used to indicate elevations; political boundaries are indicated by colored

[2] Thomas Barton, "Teaching Geography with Globes," *Education*, January, 1945, p. 313.

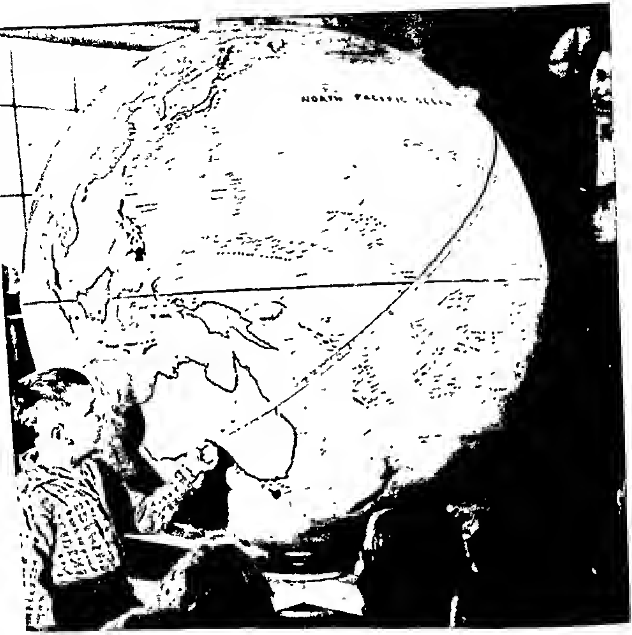


Fig. 7.6 What advantages does a very large globe like this one offer? Such globes can be made by your pupils.

lines. Some map companies are producing wall maps of the world and physical-political globes that have the same colors—a decided instructional advantage, particularly at the elementary level.

The slated outline globe (Fig. 7.7) is of great value at all grade levels. Instructors and students can write on it with chalk, indicating sucb features as locations; air, sea, and land routes; and great circles. Psychologically the unique advantage of this globe is that it permits attention to be

Fig 7.7. Slated globes and wall maps in combination help make certain geographical concepts clearer. What specific uses can you see for such maps and globes?

focused on one thing at a time. In addition, it is particularly well suited for direct pupil activity and experience. Globes of this type are available with the continents outlined and with grid as well as plain surfaces. Since the construction of slated globes does not involve the painstaking application of printed gores to the surface of a sphere, these globes are relatively inexpensive in proportion to their size.

There are various other special globes such as air-age, celestial, physical relief, and climatology globes. Each has particular advantages for specific purposes. The transparent globe pictured in Fig. 7.8, for example, is particularly good for showing the relative locations of continents, besides being used in applications in which slated and standard globes are commonly used.

Also available are plastic globe sections of major geographical areas.

Their possibilities for individual and group study are suggested in Fig. 7.9. These relief sections are strong, light, and easily handled by students. Sections can be readily colored or cleaned and hung vertically if desired.

SELECTING GLOBES FOR TEACHING PURPOSES

Having determined the types of globes required for his purposes, the instructor should be aware of certain general considerations that apply to the selection of specific types of globes. These considerations pertain particularly, though not exclusively, to globes having printed surfaces, such as political and physical-political globes.

Fig. 7.8. A transparent globe permits the viewer to see the relative positions of continents in a unique way. Lines can be marked on the surface with a grease pencil and areas can be colored as desired.

Accuracy

As was said above, the globe is the only true map of the world and hence is inherently accurate as to area, shape, direction, and distance. This accuracy is actually obtained, however, only on hand-covered globes, the gores for which are carefully wetted and painstakingly stretched by hand so as to fit perfectly on the spherical surface.

Mounting can be done by machine at considerably less cost but with reduced accuracy. When done in this way, the northern and southern hemispheres are printed separately and joined to make a complete globe. The manufacturer of machine-made globes cannot guarantee the accuracy with which the gores or hemispheres match, or the durability of the globe as compared to the accuracy and durability possible with hand mounting on steel balls.[8]

[8] A. J. Nystrom & Co., *1955–56 Catalog of School Maps, Globes and Charts*, p. 4.

Fig. 7.9. Plastic spherical sections provide another way in which the earth's surface may be studied. What advantages do you see for sections of this kind in geography study?

Size and Readability

Details on a globe are intended primarily for study by individuals and small groups at close range. Such broad features as hemispheres, land-water relationships, and the relative location of continents can be seen by the entire class, however, and for such purposes the globe should be as large as possible. In this connection, consideration of the type of mounting becomes important (Fig. 7.10). A further consideration is the fact that printed data can be presented more clearly on a 16" globe than on a 12" globe because the surface of the first globe is nearly 78 percent larger. (The surface area of a 12-inch globe is 452.39 square inches; that

of a 16″ globe is 804.25 square inches.)[4] A third factor is that distance can be estimated somewhat more easily on a 16″ globe because the scale is a convenient 500 miles to 1 inch, whereas the scale on a 12″ globe is 670 miles to 1 inch.

Simplicity

Closely related to legibility, in a globe as in a map, is simplicity. A globe is not an atlas; while much essential information can be presented on it, the inclusion of minute, rarely needed details is a handicap to its effective use. In recognition of this problem, manufacturers have made political globes and physical-political globes with simplified regional surface features for beginners. For more advanced work the traditional political and physical-political globes are periodically revised not only to keep them up to date but also to remove unnecessary details.

Color

The use of color on globes, as on maps, serves two important purposes. The first and more significant purpose is to aid legibility by distinguishing such features as land and water, lowlands and highlands, and political divisions. The second purpose is a matter of aesthetics; this is important, because pleasing colors can contribute to the favorable reception of a map, atlas, or globe.

In general, the colors on physical-political globes follow the international color scheme used on the 1:1,000,000 physical map of the world. Aside from this, there is no standard color pattern for either maps or globes. On the whole, a good color contrast that gives optimum legibility and pleasing appearance is the major factor to be considered. Lighter shades are usually more satisfactory than deep primary colors. Colors should implement the teaching effectiveness of the globe rather than attract attention themselves.

The surface of all globes is treated with a transparent coating to protect it from undue wear. It is important that this coating should not reflect light to the extent of producing a glare and thus interfering with visibility. A semiglossy finish provides a smooth surface that can be cleaned easily and creates no undue glare.

[4] Weber Costello Company, *1950–51 Map and Globe Catalog MG-42*, p. 4.

Sacramento
Stockton
Oakland
Tonopah
Goldfield
Fresno
DEATH VALLEY
LAKE MEAD
Sevier L.
Cedar City
ZION NAT. PARK
GRAND CANYON
Colorado R.

Saginaw Bay
Bay City
Saginaw
Owen Sound
Peterborough
Toronto
LAKE ONTARIO
Kitchener
Stratford
Hamilton
London
Sarnia
St.Thomas
Chatham
Ashtabula
Cleveland
Dunkirk
Jamestown
Erie
Oswego
Watertown
ADIRONDACK MTS.
Rochester
Niagara Falls
Buffalo
Syracuse
Utica
Schenectady
Albany
NEW YORK
Binghamton
Elmira
Williamsport
Wilkes-Barre
Scranton
Poughkeepsie
Newburgh
Concord
Manchester
Lowell
MASS.
Hartford
Waterbury
CONN.
New Haven

Hence wall maps that show relief are important instructional materials. Some flat maps visualize relief effectively by shading one side of mountain ranges, thus giving a three-dimensional appearance (Fig. 7.11). Excellent relief maps in three dimensions are now available in sturdy, light-weight, inexpensive plastic. These maps enable students to feel as well as see the surface features of a region (Figs. 7.12 and 7.13).

Three-dimensional relief maps of local areas can be made by teachers and pupils for any regions for which U.S. Geological Survey topographical maps are available. These maps are not difficult to construct (Fig. 7.14) and are of significant value in developing map-reading ability. One method of preparation is to enlarge a small section of a topographical map and trace the contour lines on corrugated cardboard. The contours are then cut out and mounted on top of one another in the correct relationship. The surface is covered with spackling plaster and painted when dry.

Physical maps which show actual relief and amplify it with color and shading are probably the most effective type of physical wall map for school purposes. Although any relief map exaggerates the elevation in relation to horizontal distance, land surface concepts are made more concrete

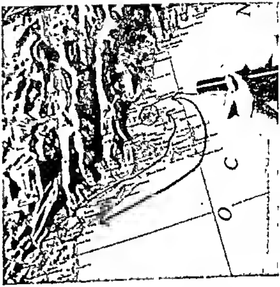


Fig. 7.12. Three-dimensional relief maps in light-weight plastic permit close-up study and feel of the terrain.

Opposite page: Sections (actual size) from a physical-political wall map. Note how elevation features are shown, and the extent of the political information presented. At what grade levels would you use such a map? Is this likely to be a good all purpose map?

Fig. 7.13. What learning opportunities are possible as these Indian pupils study and work with this relief map of their country? Could you adopt this project to help pupils understand their own locality?

by relief than by the use of more abstract hachure and color symbols.

SUPPLEMENTARY MAP MATERIALS

In addition to the standard types of maps described above, and many valuable special-purpose maps which space does not permit us to discuss, there are several useful supplementary map materials which deserve mention. These include projected maps, slated wall outline maps, and chalkboard stencil maps.

Projected Maps

A map in an atlas or reference book can be projected on a screen by means of a modern opaque projector, thus permitting the class to see and discuss it as they do a wall map.

Map slides in the small 2″ x 2″ or the larger 3¼″ x 4″ size are available commercially on a variety of current and historical topics. Handmade

slides likewise have useful applications in social studies classes both for the students who make them and for those who see them.

Map transparencies for the overhead transparency projector (see Chapter 12) are of particular benefit to the teacher who wishes to emphasize certain physical, political, or special-purpose map features and omit others. These overlays enable him to present or omit information, without extensive room darkening. Similarly, outline maps can be prepared on clear acetate with a grease pencil and filled in as the discussion proceeds.

Projected maps make possible, among their other advantages, a considerable number and variety of maps at low cost, variation in methods needed by both teachers and students from time to time, and enlargement of maps so that details can be seen readily by the entire group.

Slated Wall Outline Maps

Teachers know that pupils learn by doing, that directed pupil activity is necessary for "fixing" concepts in their minds. Teachers also know that complex ideas must be built up step by step, with each step simply and clearly defined. The slated wall outline map is very helpful in applying both of these teaching principles.

The instructor can draw one thing at a time on a slated map without the class being distracted by extraneous details. Teachers know well how group interest is heightened when one member of the class goes to the map and chalks in a name, outlines an area, or traces an important parallel or trade route under the watchful eye of the rest of the class.

Like the modern chalkboard, slated maps have been made attractive by the use of color. A slated world map and a slated globe on the same scale provide an excellent combination for teaching important area and location concepts.

Chalkboard Stencil Maps

An interesting and practical addition to a school's map materials is a chalkboard stencil map, a wall map that has perforations along state and national boundaries (see Fig. 3.4). A dusty chalkboard eraser rubbed over the surface of such a map transfers the map outline to the chalkboard.

Stencil maps are used in much the same way as are slated wall maps. The stencil map is particularly well suited when it is desired to have a

number of pupils at the board at the same time, because as many maps can be stenciled on the chalkboard as space permits. They are also convenient when the instructor wishes to present an additional illustration or two without disturbing work already on the slated map. Chalkboard stencil maps can be made rather easily on an inexpensive window shade; a few maps, expertly produced, are available commercially.

Fig 7.14. A good terrain map of a local area can be made by teacher and pupils. These pictures show the principal steps involved in one method.

EVALUATION AND SELECTION OF WALL MAPS

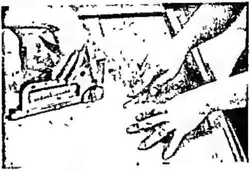
Although a wall map has certain unavoidable inaccuracies, such maps are highly ingenious and valuable materials of instruction. The flat map, for example, provides a convenient and efficient medium whereby a class of 30 or 40 pupils can see a considerable portion of the earth's surface at the same time.

The flat map is thus a valuable and essential teaching tool. Such maps are available in considerable numbers, however; therefore, as with other types of instructional materials, we need criteria for their intelligent selection.

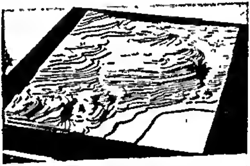
Function of Wall Maps

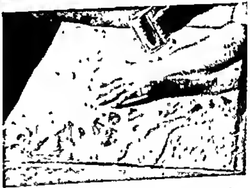
The wall map is designed to highlight major features. One writer refers to such maps as "pointer" devices and gives the following explanation: "This means that the wall map is not there to serve every purpose for which teachers and students may require a map, but to make it possible for teacher or students to point out to others in the room some essential

features in the distributions which a given map shows."[5] The wall map is not intended for a detailed study of small areas; that is the function of an atlas or a map in a textbook.



Similarly, the most effective wall maps do not contain numerous kinds of information on the same map. A good political map, for example, typically presents political bouodaries, principal cities, rivers and water areas, and important transportation routes; depending upon the level and function of the map, a few other features may be included. Normally such additional information as contour lines, land use, and rainfall or population distribution is not presented on the same map because too much material makes the map difficult to interpret and use. Emphasis on one type of information and the avoidance of extraneous details are characteristics of good maps.





Small inset maps are frequently printed on the margins of a wall map to provide such information as rainfall, vegetation, thermal regions, and population distribution. Although

[5] Edna E. Eisen, "Maps, Globes and Charts," *American School and University*, 1947, p. 190

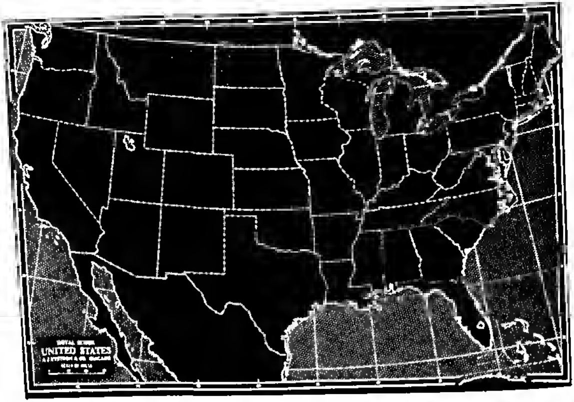


Fig. 7.15. Slated wall maps can be used with slated and regular globes to maintain a balanced perspective on concepts of surface. Can you think of other benefits of having several types of wall maps and globes?

such information is unquestionably important, these inset maps can be seen by only a small portion of the class at best and in consequence are of limited value. A wall map can of course be studied in detail at close range, but the maps in atlases and textbooks are effective and less expensive for this purpose.

Desirable Characteristics of Wall Maps

Most wall maps "look" good at first inspection; an attractive, artistic appearance is indeed highly desirable. Several factors are more important, however, including the suitability of the projection, simplicity and appropriateness to grade level, size and visibility, and color.

SUITABILITY OF THE PROJECTION. The term "map projection" refers to the method used to represent the curved surface of the earth on a flat map. The projection determines whether the map has relatively correct area, shape, direction, and distance properties.

No flat map can be correct in all these properties. In fact, few maps

are accurate in more than one. Fortunately, the amount of error on maps of small sections of the earth's surface is slight enough to be of little consequence for other than technical purposes such as navigation.

It is only with world maps or maps of a hemisphere or large continental areas that the teacher needs to consider the projection in selecting maps for nontechnical classroom purposes. In these maps the most important quality to be sought is *equal area.* Distorted impressions of the relative size of land and water areas, particularly in areas bordering the arctic regions, are responsible for many commonly held misconceptions as to our location with respect to other important land areas of the northern hemisphere. Several generations of exposure to nonequal-area world maps in our schools, plus limited use of globes, have probably contributed, more than any other factor, to our geographic misconceptions of parts of the world which have become highly significant for our future welfare.

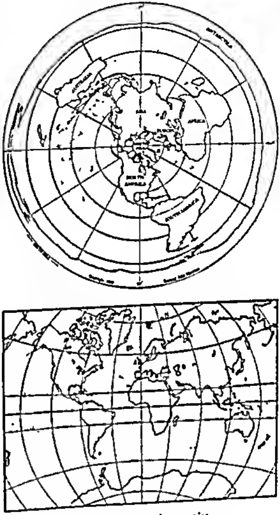


Fig 7.16 A variety of ingenious projections have been developed so that flat maps could be made of the earth's spherical surface. Compare each of these grids with respect to their equal-area characteristics.

Suitability of projection can easily be judged by employing the *grid comparison method,* because the extent to which a flat map of a hemisphere or the world is distorted is readily revealed by a comparison of its grid with that of the globe. The grid is the pattern of parallels and meridians upon which all maps are based. (See Fig. 7.16.)

There are a number of characteristics of the earth's grid, but only three are important in determining whether or not a map has the property of equal area. (1) The area enclosed by any two parallels and two meridians

is the same anywhere between the same two parallels. (2) Meridians are equally spaced on the parallels and converge toward the poles. (3) Parallels are parallel and equidistant, from equator to poles.

No flat map can be expected to show all the above characteristics. Therefore it becomes a question of how closely a given map approximates them. Examine the map grids in Fig. 7.16 and apply the above criteria for equal area. Then do the same with the world and hemisphere maps in your classroom or school. You will soon learn to distinguish which maps have good area characteristics.

Several suitable kinds of classroom map projections are available as *minimum error projections*. The values of these little-known maps have been described by Robinson.[a] These projections are a compromise in which areas, shapes, direction, and distance properties are balanced so as to present as realistic a map of a segment of the earth's surface as is possible. Although no property is completely accurate on a minimum error projection, the inaccuracies are moderate and inconspicuous to even a skilled observer. For other than technical or scientific purposes, therefore, these projections are quite satisfactory.

Several other projections which have specific properties come close to fitting into the minimum error group. Among these are the Lambert Conformal, the Albers Equal Area, and the Lambert Equal Area. The latter two give accurate area relationships, and the shapes on the Lambert Con formal are of above average validity. In addition, on all three projections there is a good balance of the remaining properties; the Lambert Equal Area, for example, presents correct area and true direction (it is the only projection that combines these two properties), good shape, and fairly good distance.

SIMPLICITY AND APPROPRIATENESS TO GRADE LEVEL. No teacher would think of using an eighth-grade reading text with a second-grade class. Yet quite often the same maps are used at all grade levels, with little apparent regard for their complexity.

Wall maps are frequently crowded with too much information. As a result they are difficult to read clearly more than a few feet away, and are hard for the average pupil to interpret.

It is unnecessary to provide a different map for each significant geographical concept, but there can and should be distinct levels of com-

[a] Arthur Robinson, "An Analytical Approach to Map Projections," *Annals of the Association of American Geographers*, December, 1949, p. 287.

plexity in maps designed for elementary, secondary, and college use. In recognition of this need, map publishers are making available a steadily increasing number of graded maps.

SIZE AND VISIBILITY. Wall maps are visualizations devised to present complete or partial global surface information on a single flat surface. Wall maps make it possible to sense, at a single glance or viewing, key geographical, physical, or political concepts which on a globe would be always partially hidden to a single viewer.

In order to be useful in classroom study situations, wall maps must be so designed and of such size that students seated normally about the room can see and "read" the important relationships revealed by the map. Important symbols, shapes, names of gross land and water masses, and key terrain phenomena must be presented by means of such effective color and size of print as to be visible, and thus understood by all viewers.

The printing on wall maps which relates to important concepts and the names of continents and countries should be in large type and with suitable spacing so as to make reading it possible anywhere in the seating area. "In so far as any data on a map cannot be grasped by the eye, and easily read, in just that measure is the map encumbered with useless material, and is a failure."[7]

Precise studies by Luckiesh and Moss[8] have determined the relative visibility of printed type of varying sizes. The relative visibility of that used on wall maps and charts is one important basis for map selection. Other factors than type size—among them background contrast, variations in type design, and crowded elements—influence legibility.

A study by Robinson[9] shows that 2" letters at 30 feet appear the same as letters 1/8" high at a normal reading distance of 18 inches. Letters ½" in height require above-average vision to be read at 20 feet.

Ordinarily, world maps need to be larger than maps of continents or smaller areas. Because of the area covered by world maps, key relationships, to be visible, must be presented by maps at least 4 to 5 feet wide and preferably wider.

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[7] J. Paul Goode, *Goode's School Atlas*, Rand, McNally, Chicago, 1918.

[8] M. Luckiesh and F. K. Moss, "The Quantitative Relationship Between Visibility and Type Size," *Journal of the Franklin Institute*, vol. 227, pp. 87–97.

[9] Arthur Robinson, "The Size of Lettering for Maps and Charts," *Surveying and Mapping*, January–March, 1950, pp. 37–44.

COLOR. Appropriate color on maps is related closely to clarity and general effectiveness. Garish reds, blues, greens, purples, and oranges serve no useful purpose and in addition are unpleasant to look at. Heavy colors tend, furthermore, to make the lines and printed data more difficult to read. For both legibility and attractiveness, colors in softer tones are preferable. It is desirable on world maps to have possessions in the same color as the mother country. Identical color patterns for world maps and globes are also helpful and effective, particularly for use with elementary-school classes.

EFFECTIVE USE OF GLOBES AND MAPS

"I know of very few studies that do not have certain tools that must be mastered before the student can proceed," says one geographer. "Even literature depends upon the alphabet and grammar."[10]

"An intelligent citizen must use maps," says another. "From maps in newspapers and magazines, he obtains information on world and local affairs. Students in school also use maps as a source of information. If student and adult alike are to receive the full value from maps, they must be able to read them easily and accurately."[11]

"If correct concepts of world relationship are to be gained, one must have a globe. The globe is the best representation of the world that we have. . . . Every school room, even in the primary grades, should have a globe."[12]

There is need for teachers at all levels to consider seriously how to use maps and globes better in instruction so that students will learn (1) how to read them, and (2) how to get information from these essential tools of learning.

MAP-READING READINESS

Globes and maps are highly abstract. They represent the earth or sections of it by means of lines, colors, and symbols which bear little resemblance to the actual appearance of the earth's surface as a child

[10] Roderick Peattie, *The Teaching of Geography*, Appleton-Century-Crofts, New York, 1950, p. 28.

[11] Kathryn T. Whittemore, "The Place of Maps in Social Education," *Journal of Geography*, March, 1948, p. 110.

[12] Zoe A. Thralls, "The Use of the Globe," *Social Education*, April, 1947, p. 165.

sees it. They are a language all their own and, like any language, they must be learned. No one is born with the ability to read globes and maps. He must be taught this just as he must be taught how to read words, sentences, and paragraphs.

Start with the pupil where he is. Instructors are familiar with this principle. It is inherent in good teaching at all levels. It is also another way of expressing another principle—that before symbols of any kind are taught, the pupils must have a background of experience which can give these symbols concrete meaning.

Fig. 7.17. Globes, pictures, and reading materials should be handy for use whenever needed.

Where *is* the child so far as globes and maps are concerned? What is he familiar with that the teacher can use as a basis for beginning to teach him globes and maps? His home and yard, his immediate neighborhood, the way to school, his schoolroom, the school yard, and perhaps other parts of the community where his class has gone on a field trip.

"Children begin early and without direction to represent places they have seen by representing them with blocks or other materials. After a Buffalo kindergarten class had visited the Peace Bridge, the children built a model of the bridge across the classroom. They were able to tell which end of their bridge represented the Canada end and which represented the end near their school. They pointed out where the river flowed beneath the bridge."[13]

By the time they are in the third grade, children are ready to participate in making pictorial maps of familiar sections. The harbor as they saw it will be faithfully reproduced; and such things as ships, docks, and the lighthouse are likely to be drawn realistically (Fig. 7.18). Perspective

[13] Kathryn T. Whittemore, "Maps," *Nineteenth Yearbook of the National Council for the Social Studies*, 1948, p. 120.

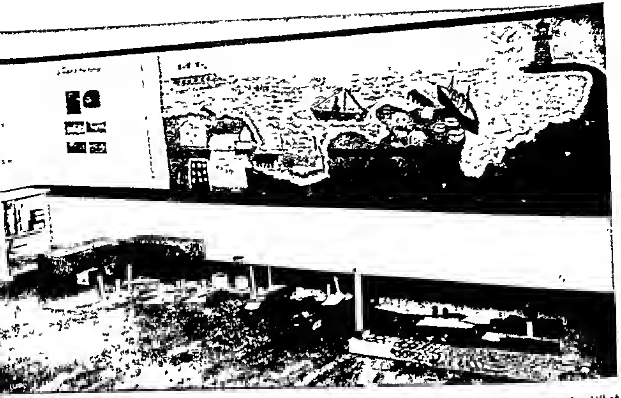


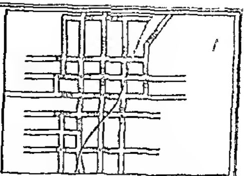
Fig. 7.18. This map of Los Angeles Harbor was made by primary pupils after a field trip. What educational benefits do you see in this kind of map activity?

and scale may be crude or entirely absent, but nevertheless such maps show the beginning of a feeling for relative size, location, and distance. Providing experiences which naturally give rise to pictorial murals and maps is a good way to begin formal map work. Before long, symbols can be introduced to represent streets, buildings, important landmarks, and topographical features. These new meanings will be revealed through careful study of standard geographical terms such as are pictured in Fig. 7.19.

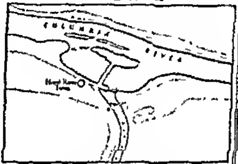
Use pictures. Pictures play a vital part in map-reading readiness. They are an interesting supplement to field trips, besides opening large areas of the earth to observation which would otherwise be impossible. Early concepts of land surfaces and climate can be developed through pictures. Charts are available which combine pictures with large-scale maps of small areas to illustrate the meaning of various map symbols (see plate facing this page).

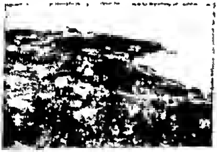
Use a globe. The globe is an essential part of any map-reading readiness program. Not only are all flat maps derived originally from the

This is a picture of Monona, a small town in Iowa. The picture was taken from an airplane to show the streets and railroad. On the map at the right find the sign or symbol for the streets and the symbol for the railroad.

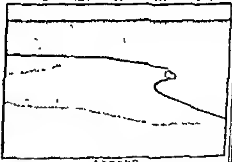


Here is a picture of Hood River, a town in Oregon, located on the Hood and Columbia rivers. On the map at the right find the sign or symbol for a town, a symbol for a river, a symbol for a road, and a symbol for a railroad.





Above is a picture of a small town in Quebec, Canada, located on the seacoast. On the map at the right find the sign or symbol for a town, for land, for water, for the seacoast, for a road.



Pictures add meaning to maps and map symbols.

Fig. 7.20. Curiosity plus a good globe sets the stage for learning.

GLOBES AND MAPS IN THE INTERMEDIATE GRADES

In the fourth grade students are taught to use the globe. They should learn such things as (1) the actual and relative location of the areas being studied; (2) direction; (3) rotation and the cause of day and night;

(4) the equator and climatic zones. They should also form some inferences as to length of day, climate, and human activities in any given place.

Introduce physical-political globes and maps. As North and South America and the other lands of the earth are studied in the fifth and sixth grades, the globe should be used regularly to establish and maintain correct concepts of relative location, size, and climatic influences. Physical-political maps and globes are used at this level and cross reference between them should become habitual.

Clarify scale concepts. As more maps are used, the scale assumes significance and its meaning must be carefully taught to avoid extensive misconceptions. The ability to determine locations in terms of latitude or distance from the equator, when combined with the ability to read scales, enables the pupil to compare and contrast different countries. He may discover such fundamental facts, for example, as that Japan has approximately the same area as California and over ten times as many people. Such discoveries stimulate questions and set the stage for meaningful learning.

Have the pupils make maps. One valuable application of "learning by doing" is to have the pupils make maps of their own (*Fig.* 7.21). This is excellent for developing both map-reading ability and the power to interpret the data on maps. It is also a sound application of the principle of starting the learner where he is.

It is important to distinguish between mere copy exercises and creative map construction. While there may be certain values in transferring the thirteen colonies from a textbook map to a desk outline map, this should not be confused with actual map construction or the learning values accruing therefrom.

Relief maps of a local area provide an excellent basis for understanding surface features of the area and the physical and elevation symbols used on physical maps. These three-dimensional maps can easily be made by the teacher and pupils. U.S. Geological Survey topographical maps are available for most local areas and should be used, along with first-hand observation, for accurate construction. Several methods of construction give satisfactory results.[15] The great value of this type of map is that it is

[15] See *ibid.*, pp. 237–243, for details of one simple method of constructing a plastic relief map.

considerably more realistic than any flat map and accordingly can be very valuable in giving meaning to the physical symbols of flat maps.

GLOBES AND MAPS IN THE SECONDARY SCHOOL

A wide variety of maps and globes is essential at the secondary level where world concepts are developed on a broad scale. By this time the

Fig 7.21. What kinds of learning are likely to take place when pupils make their own maps?

student should have learned to interpret maps as well as to "read" them, but this ability cannot be taken for granted. All too frequently he will have missed something along the line, perhaps because the teacher himself was not well enough trained. In any case, map reading, like English and spelling, is the responsibility of teachers at all levels. If the secondary-school pupil lacks basic map-reading skills, he must be taught them before he can proceed successfully.

In the junior high school new concepts must be learned such as the

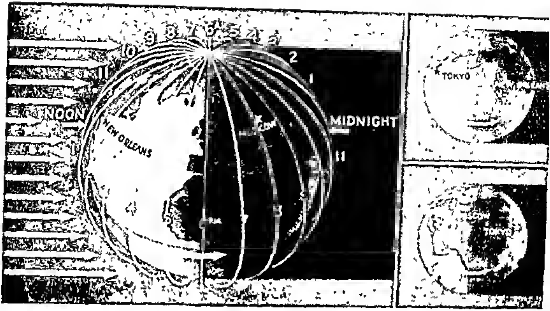


Fig. 7.22. The concept of time and how it is determined for various parts of the world is more easily understood with an illustration like this time-cage.

earth's revolution, time zones (Fig. 7.22), the international date line, and great-circle routes. Globes are invaluable for teaching such concepts, and slated globes are particularly helpful for related pupil exercises. At the junior and senior high-school levels numerous special-purpose maps containing economic, historical, and literary data are used regularly.

As with all other forms of audio-visual materials, the instructor selects and uses the globes and maps that achieve his purposes better than any other materials that are available to him. He uses them in combination with such other materials as textbooks, reference books, atlases, flat pictures, slides, films, filmstrips, field trips, bulletin board displays, and desk outline maps—according to what is needed. These materials are means rather than ends in themselves—means to gaining a clear and vivid understanding of the geographical, social, and cultural concepts that give meaning to the world in which we live.

SUMMARY

Globes and maps are a vital part of the school's instructional materials because they are the only means by which large areas of the earth, or

the earth itself, can be effectively represented. Although globes are the only true maps of the earth, flat projections are necessary for detailed study, for ease of viewing, and for seeing the whole earth at one time.

No flat map, however, can avoid distortion in two or more of the following properties: area, shape, direction, and distance. It is important, particularly on world maps, to be able to determine readily what characteristics a given flat map does or does not possess. This can be done with relative ease by comparing the map grid with the globe grid. For most school purposes, equal area on a wall map is of primary importance.

Additional factors in evaluating flat maps are simplicity, size, legibility, and color. Maps for beginners should be simplified, larger than is commonly the case, and colored so as to enhance both legibility and attractiveness. More advanced students may use more complex maps, but the same principles concerning size and legibility apply at all levels. Type must be more than ½" in height to be read easily at a distance of 20 feet.

Appropriate globes for teaching purposes include simplified political globes for beginners, slated globes, and political-physical globes. Several sizes and mountings are available. While no ordinary globe can be read from a distance of more than a few feet, there are significant instructional advantages in using 16" globes rather than smaller ones. Slated globes should be 20" or more in diameter. Simplicity, visibility, and color considerations apply to globes as well as to flat maps.

Valuable supplementary map and globe materials for group and individual instruction include map slides and transparencies, slated wall outline maps, and chalkboard stencil outline maps. Plastic relief maps and pupil-made large-scale relief maps of local areas are likewise of great value in teaching map reading.

Effective use of globes and maps is based on map-reading readiness, which is developed in the primary grades. Although no formal instruction in globe and map reading is usually given at the primary level, elementary concepts of location can be developed through field trip activities. An attractive simplified globe in primary-grade rooms stimulates questions which lead to initial understanding of the earth's sphericity.

Specific instruction in globe reading and later in map reading begins in the fourth grade and continues thereafter. The object of such instruction is twofold: to develop ability to "read" globes and maps and to de-

velop facility in interpretation. The activities and materials for these purposes should be carefully graded in difficulty as the child progresses from simple to more and more complicated ideas. Whenever maps are used there should be a globe for ready reference.

Globes and maps are vitally important for understanding the world in which we live, but they are not ends in themselves. Like other visual and auditory materials, globes and maps are most effective when used in combination with pictures, text and reference books, slides, motion-picture films, field trips, and such other media and activities as will help the pupil understand what is being taught.

Suggested Activities

1. *Have a committee of students make a survey* of the wall map and globe materials in an elementary or secondary school. List the materials, by classrooms, according to type, size, projection (wall maps), mounting (globe), accessibility, and condition.
2. Analyze a list of globe and map materials in a given school and recommend materials which should be added, discarded, or replaced. Justify each recommendation in terms of principles discussed in this chapter.
3. Prepare a simple test on map reading and give it to the class. Include such items as the following:
   a. Alaska is nearly as large as the United States. (True or false.)
   b. Greenland is larger than Mexico. (True or false.)
   c. Name six countries through which the 40th parallel runs.
   d. In what general direction is Moscow from Chicago?
   e. Which is the most direct route from San Francisco to Japan:
      (1) Westward via the Hawaiian Islands.
      (2) Westward, but slightly north of the Hawaiian Islands.
      (3) Northwestward along the Alaskan coast and the Aleutian Islands.
      (4) Northward and nearly over the North Pole.

   Have the students check their own papers and discuss the implications of the errors that were made.
4. Using the grid comparisons method, analyze several wall maps including a Mercator projection, an azimuthal equidistant polar projection, a Lambert Equal Area projection of a continent, and a sinusoidal projection of Africa or South America. Explain the accuracies and inaccuracies of each map as to area, shape, direction, and distance. Tell how you reached your conclusions.
5. Have class committees secure catalogues from several map and globe companies and select specific globes and wall maps for (a) a primary room,

(b) a sixth-grade room, (c) a junior-high-school social studies room, and (d) a high-school world history room. Explain the selections in terms of appropriateness to grade level and subject area, simplicity, legibility, color, and projection.

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Toward Better Understanding of Maps and Globes, Denoyer-Geppert Co., 1955.

Sound Films

Airplane Changes Our World Map, B&W, 11 min., Encyclopædia Britannica Films.
Global Concept in Maps, B&W and Color, 10 min., Coronet Films.
How to Make a Globe, B&W, 12 min., University of Indiana.
Impossible Map, B&W and Color, 10 min., National Film Board of Canada.
Introduction to Map Projection, B&W, 18 min., United World Films.
Maps and Their Meaning, Color, 14½ min., Academy Films.
Maps and Their Uses, B&W and Color, 10 min., Coronet Films.
Maps Are Fun, B&W and Color, 10 min., Coronet Films.
Relief Models, Color, 10 min., Lipscomb College.
Understanding a Map, B&W, 10 min., Young America Films.

Filmstrips

Flat Maps of a Round World, 58 frames, B&W, Popular Science Publishing Company.

Maps, Globes and Graphs, 24 frames, Color, Eye-Gate House.
Maps and Men, 44 frames, B&W, Popular Science Publishing Company.
Maps and Their Meaning, 53 frames, B&W and Color, Popular Science Publishing Company.
Starting with the Globe, 75 frames, Color, Denoyer-Geppert.
Using Maps and Globes, 48 frames, Color, Society for Visual Education.
We Live on a Large Globe, 52 frames, B&W and Color, Popular Science Publishing Company.

8.

nt

"I see," quoth he, "the Elephant
Is very like a snake!"

The *Fourth* reached out an eager
hand,

And felt about the knee.
"What most this wondrous beast is
like
Is mighty plain," quoth he;
"'Tis clear enough the Elephant
Is very like a tree!"

The *Fifth* who chanced to touch the
ear,
Said: "E'en the blindest man
Can tell what this resembles most;
Deny the fact who can,
This marvel of an Elephant
Is very like a fan!"

The *Sixth* no sooner had begun
About the beast to grope,
Than, seizing on the swinging tail
That fell within his scope,
"I see," quoth he, "the Elephant
Is very like a rope!"

And so these men of Indostan
Disputed loud and long,
Each in his own opinion
Exceeding stiff and strong.
Though each was partly in the right,
And all were in the wrong!

In a word, where sensory experience is involved, it should be as complete as possible. One learns better when all pertinent senses are employed. A motion picture of a bakery may be excellent, but it does not supply the heat of the great ovens or the delectable odors which are so much a part of the bakery environment.

CONCRETE EXPERIENCE IN LEARNING

You who have learned how to operate a motion-picture projector have an apt illustration of the importance of concrete experience. You can study a projector manual for some time without acquiring any operating skill. But by actually working with a projector for a short time under the guidance of an instructor you can learn quickly and easily. You "learn by doing."

Likewise, the natural science primary class acquires vivid aod realistic impressions of how a butterfly emerges from its cocoon by watching the process in the classroom. Children in nursery school learn about getting along with other children from actual experience in getting along with them. Upper-grade pupils lay out a baseball diamond by using their mathematics; high-school social studies classes learn about their community by surveying it at first hand. Students learn important things about government by taking part in student council activities.

In many such ways teachers apply what they know about the importance of first-hand concrete experience in learning. If all learning could be of this type, school would indeed be a fascinating place for every

Fig. 8.1. The expression on the faces of these children shows the intensity of their interest in a horned toad. Does this provide a good opportunity for developing a promising learning situation?

pupil. One reason why first-hand experience is so effective is that it involves the whole child—his physical senses as well as his intellect. It is a natural and satisfying way to learn.

MODIFIED SENSORY EXPERIENCE

Yet we know that many things of a physical character do not lend themselves well to first-hand learning. You can visit the local waterworks and power plant without gaining much understanding of how the great pumps and generators work. You can get a thrill out of watching a giant Diesel locomotive move a heavy train without having any idea of how it operates. You can observe the moon for a lifetime without acquiring an understanding of its phases. Incidentally, how would you explain the phases of the moon to an intermediate-grade class?

The operation of some things like a pump, a generator, and an engine cannot be seen from the outside. You have to look at the interior to see how they work and even then their intricate construction may be baf-

fling. The solar system can be seen to some extent but it is too vast to be understood from direct observation alone. Teachers need somehow to modify direct experience in such cases if they are to help their pupils learn efficiently. One way of doing this is by using models.

The social studies teacher also is continuously faced with the need for bringing realism into the study of the far places of the earth—mountains, plains, deserts, and jungles; of peoples and customs of long ago; and of trade, industry, agriculture, and government in the many sections of our own country. He has a great wealth of printed materials to draw upon and he uses them extensively, but he knows that he needs somehow to give added meaning to the words his pupils read. So he uses a great variety of pictures, films, maps, models, objects, field trips, and other devices which make the learning experience more real and lifelike.

The point is well expressed by Sternig in a discussion of pupil-prepared visual materials:

"Learning from the printed page is only one method. It teaches best when related to something real in the actual environment which can be seen and handled and to which the printed ideas apply. All ideas are more easily gained and more securely held when learned through association with real things. This is a fundamental principle of education! It can hardly be considered a modern discovery but it is too often overlooked by teachers."[1]

CHARACTERISTICS OF EFFECTIVE MODELS

Models may be defined as *recognizable three-dimensional representations of real things.* The thing represented may be infinitely large, like the earth, or as small as an atom. It may be an inanimate object like a building, a monument, or a mine shaft; or it may be a living organism like a paramecium, an eye, or the human heart. The model may represent something as intricate as a turbojet, an atomic-powered submarine, or a cyclotron, or as simple as a piece of wire. It may be complete in every detail or considerably more simplified than the original.

In the light of what we know about the importance of sensory experiences in learning, let us examine several characteristics of effective models for teaching purposes.

[1] John Sternig, "Home-Made Visual Aids," *See and Hear*, April, 1946, p. 23.

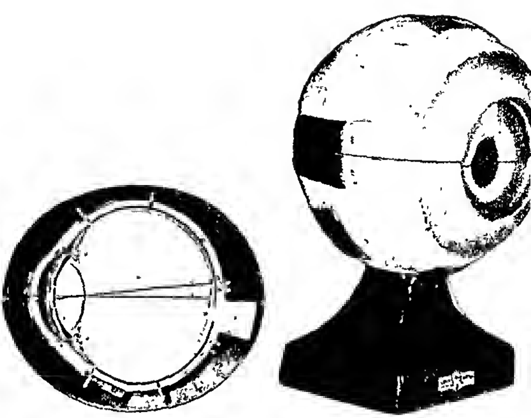


Fig 8.2 What can you do with a model of the human eye that you could not do as well with a chart? Should chart and model be used together? Why?

1. *They are three-dimensional.*

Most objects around us have a third dimension; that is, they have depth or thickness as well as height and width. Effective models also have depth. This is one of their unique characteristics and it contributes significantly to their realism. If the third dimension is unimportant to comprehension, a model is probably unnecessary. In that case a picture or chart may serve as well or better.

The human eye is a good example. A model like that in Fig. 8.2 is necessary adequately to convey the spherical shape of the eyeball; the relative positions of the rods, cones, and optic nerve; and the important relationships between the shape, the flexible lens, and the delicate muscles which control its focus. These concepts are important in learning how the eye really functions.

2. *They reduce large objects or enlarge small objects to a size convenient for observation.*

We can see only a very small portion of the earth's surface even from an airplane. With a globe, however, we have a model which enables us to picture the whole earth without difficulty. The one-celled parameeium is much too small to be seen without a microscope, but a model like that in Fig. 8.3 makes it visible to an entire class. Similarly, an enlarged or close-up view of the head and stinger of a mosquito (Fig. 8.4) gives us an opportunity to examine this unusual structure in detail.

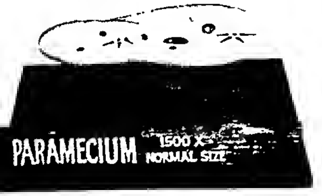


Fig. 8.3. Some materials are expensive, but this model was made by a science teacher at a cost of less than fifty cents.

Ideally, a model should be large enough to be seen readily by the whole class. Frequently, however, the cost of large models and the problem of storage space for them force a practical compromise in the form of smaller models than we would like.

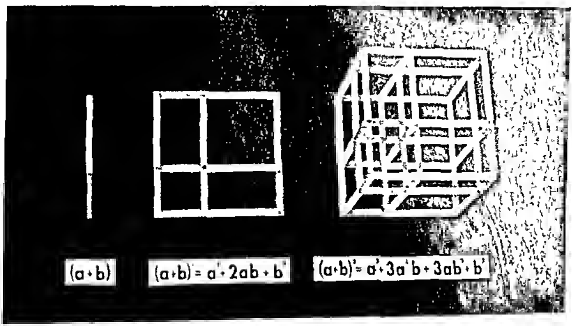
3. *Models provide interior views of objects which are normally covered or otherwise invisible.*

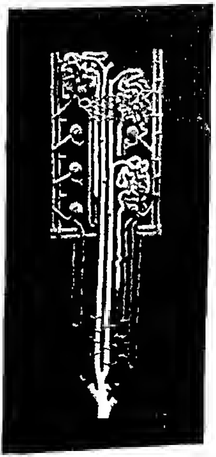
A cutaway model of a human tooth reveals the layers of enamel and dentine and the nerve which otherwise would be difficult to visualize. The rapidly spinning parts of a generator, a steam turbine, or an automobile engine are completely enclosed, but a simplified working model with removable or cutaway sides makes it possible to see and understand how they work. Similarly a model of the human ear (Fig. 8.8) enables the instructor to explain more clearly how the delicate internal parts function.

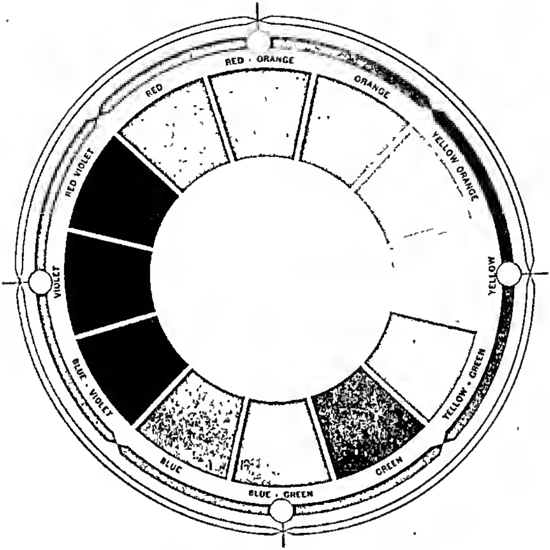
4. *Nonessentials are removed so that fundamentals can be more easily observed.*

Opposite page: The type of color used varies with the purpose for which color is employed. When realism is called for, natural colors are used. To attract attention, as posters do, bright colors and strong contrasts are effective. The mood or atmosphere of a display or exhibit is made gay and cheerful with warm, bright colors, or quiet and restful with cool, soft hues.

Here is illustrated still another use of color—to emphasize and distinguish between important parts of models. At top is a 3-D visual representation of squaring and cubing an algebraic sum. Below are Mueller-Ward models of a kidney in cross section and of a dissected kidney tube, greatly enlarged. How significant is color in these models?


$(a+b)$
$(a+b)^2 = a^2 + 2ab + b^2$
$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$





The selection of color combinations for displays, exhibits, picture mountings, graphics, and models is simplified by using a color wheel. Such a wheel is made up of the three primary hues—red, yellow, and blue—and a series of in-between colors created by mixing varying proportions of the primary colors. Many additional color variations are possible, and the intensity of any given color may vary from dull to brilliant. Colors which go well together include (1) complementary colors, or those directly opposite each other on the color wheel, (2) triads, or any three colors equidistant from one another on the wheel, (3) split complementaries, which consist of any single color plus the two colors on either side of its complementary color directly opposite on the wheel; or (4) analogous colors, or colors having the same primary base (red, yellow, or blue) and commonly next to each other on the color wheel. Provided that colors which harmonize are used together, the principles illustrated by this simple color wheel may be readily applied in any problem of color selection.

As you lift the hood and look at an automobile engine, the impression you receive is likely to be somewhat confusing and complex because of the considerable array of subsidiary parts, wires, tubes, and other paraphernalia that are required for a modern car. But such a look may be more revealing if you have studied a cutaway model such as the one shown in Fig. 8.5.

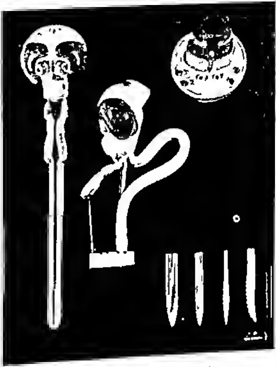


Fig. 8.4. Mueller-Ward models of the head and proboscis of a mosquito, showing several kinds of "stingers" and the method by which the skin is penetrated. What use could be made of this model in a biology or natural science class? What readiness experiences should teachers arrange for before asking students to interpret this model?

The electric motor, the jet engine, and the giant pumps in municipal pumping stations are other examples of complex mechanisms which can be readily explained with the help of simplified models.

The advanced student, however, needs models that are more complete. Students in auto mechanics classes frequently have actual engines to work on. Agricultural engineering shops have cutaway tractor engines like that shown in Fig. 8.6. Shops in vocational schools and large high schools may have a cutaway Diesel engine (Fig. 8.7) for instructional purposes.

5. *Models employ color and texture to accent important features.* The role of color in models is illustrated in the plate facing page 216. Two related instructional purposes are served by color. The first is identification of important or related parts, as in the engine models. The second purpose is increased comprehension of function or operation. In addition, color serves to make models more eye-catching, interesting, and in many cases more attractive. This does not suggest that color should dominate to the extent of minimizing other features of a model. Effectively colored models are characterized by a balance in color harmony and intensity which emphasizes the parts and functions that are important to comprehension. In the algebra model,

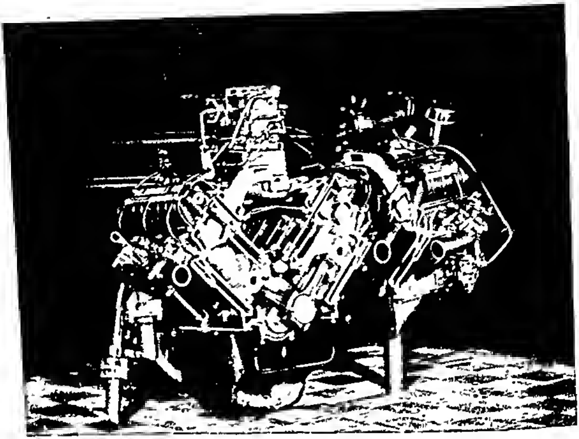


Fig. 8.5. How can this cutaway model help the instructor explain the operation of the V-8 engine?

color serves primarily to enable the student to follow visually what happens when algebraic sums are squared and cubed. In the anatomy models, color assists understanding mainly because identification is made more easily through its use.

This role of color applies to models generally. Important and distinctive parts are colored so that each one stands out clearly. The colors may be natural (this is desirable on some anatomy models), but more often they are made brighter or otherwise changed for better visibility. Parts that are not essential for an understanding of the model are often in less conspicuous colors. The engine block in Fig. 8.7, for example, is a neutral gray.

Bright surfaces or subdued surface textures may be used in order that complex models or engines may be more easily understood. Special textures such as highly polished or plated surfaces are frequently used to accent important sections. The pistons and tubing may be chrome-plated for better visibility and attractiveness. Less important surfaces may be left rough or unpolished. Cylinder walls, other interiors of cut-

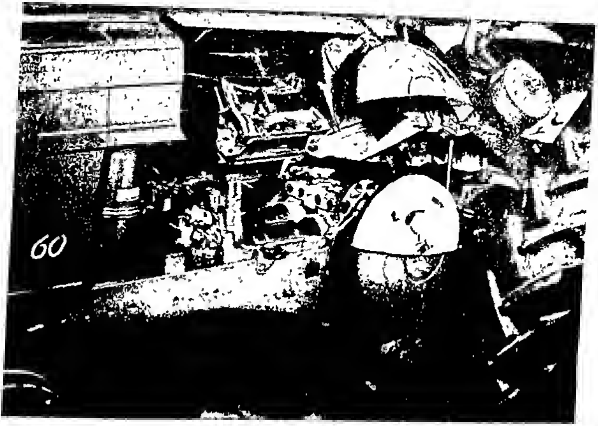


Fig. 8.6. The real thing may provide the best opportunity for practical learning. At what level is this cutaway of a tractor engine likely to be most useful for instruction?

away sections, and wiring may be polished or painted in contrasting colors so that the parts or operations can be easily traced.

6. *The most useful models can be taken apart and put together again.* The value of models in instruction lies not only in their three-dimensional realism but also in the fact that they can be examined by touch as well as by sight. The model of the eye in Fig. 8.2 can be taken apart so that each part may be examined individually. Fitting each part back in its proper position gives the student a degree of familiarity with the st are ture of the eye which is difficult to achieve in any other are not commore, the interrelationship of the several parts is likel

A model of the human ear may be so constructed as to have been re- of the hammer, anvil, and stirrup bones (Fig. 8.8). The n these three little bones fit together has much to do with o advantage in how we hear. Their function can be demonstrated more rea

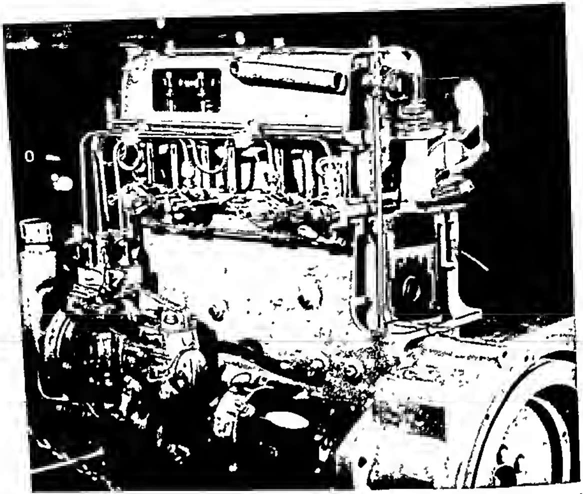


Fig. 8.7. Cutaway engines in operation are popular features in an exhibit. Note how this Diesel engine is dressed up with chrome and paint for exhibit purposes. Besides making it more attractive, what learning advantages does this kind of treatment offer?

can be removed, examined, and put back in the proper position.

THREE-DIMENSIONAL MATERIALS OTHER THAN MODELS

Thus far in this chapter we have considered the importance of well-rounded sensory experiences in learning and some ways in which models can provide them when direct, first-hand experience is either impractical ... ssible. We now consider several other types of three-dimensional

Bright su... likewise provide opportunities for useful learning ex-
that complex m... are objects, specimens, mock-ups, and dioramas.
textures such as
to accent impor
plated for bett... oint in using a model if the real object can be brought
may be left... n and if it is not too complex for easy observation. You

would not, for example, use models of Indian arrowheads, tools, and cooking utensils if you could secure the real objects. You might prepare a model of a wigwam and an Indian village if these were important elements in the social studies curriculum, but you would probably also have your pupils bring Indian beadwork, arrowheads, tools, utensils, blankets, and other crafts for display. Models and objects supplement each other in providing realism, authenticity, and interest.

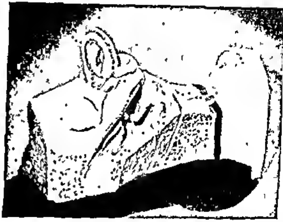


Fig. 88. How do the removable parts in this model of the human ear help make it an effective teaching device?

Whereas a model is a recognizable three-dimensional likeness or representation of the real thing, *an object is the real thing.* These "things" are removed from their normal setting so that they can be brought together for study and analysis. This means that the object is not seen in its natural surroundings and therefore may appear less "real" than it does in nature. A mounted robin in a display case filled with other mounted birds loses some of its realism even though it may be a good piece of taxidermy.

Another characteristic of objects as visual teaching materials is that they are complete units rather than parts of units. The robin just mentioned is, in appearance, a complete robin. A hammer or other tool, a frying pan, a vegetable, flower, or leaf, an insect or animal, a spear or a bow and arrow, an automobile engine, and countless other things—all are considered to be objects only when they are complete. A hammer head without a handle, a squirrel's tail, and an arrowhead without a shaft are parts of objects rather than objects and are arbitrarily classified as specimens. The word "specimens" also includes certain objects which are typical of a class or group of objects; hence the two terms are not completely distinct in meaning.

Specifically, we may define objects as *real things which have been removed as units from their natural setting.*

You can think of many real objects which can be used to advantage in the classroom or laboratory. A few examples will suffice.

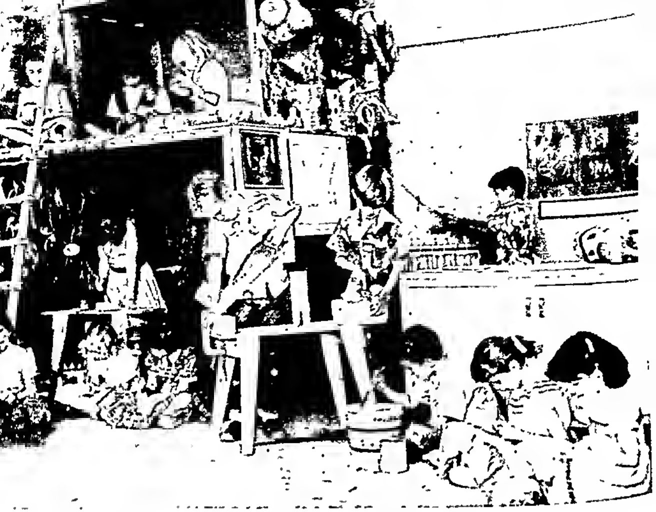


Fig. 89. What types of three-dimensional learning materials are in evidence in this Hopi Indian dwelling project? What kinds of learning activities are encouraged by these activities?

Science: Cocoons; rock collections; plants and flowers; fish, mice, worms, and other small animals; different kinds of coal, oil, and other fuels; samples of ore; sea shells; a telegraph key, radio set, doorbell, telephone; dry cells and storage battery.

Social Studies: Locally manufactured products; period costumes; relics and souvenirs (as of political campaigns); coins and stamps; fuels; Indian relics; raw materials such as cotton, wool, flax, ores, and grains; early American utensils, toys, tools, furniture, spinning wheels, pictures, and books.

English: Period costumes; clothing and relics; letters and manuscripts; musical instruments; fabrics; stage props; tapestries; speaker's podium and microphone; printing type and layouts.

Mathematics: Slide rule, micrometer, vernier scale, and other measuring instruments; transit; sextant, compass, timepieces, and navigation

charts; bottles and other containers for volume measurements; coins; drafting tools such as dividers, T squares, and triangles; and identical familiar objects for instruction in addition, subtraction, division, and multiplication.

Home Economics: Fabrics, textiles, thread, and various tools for dress-making; utensils and foods; period costumes and clothing to show trends in design; raw textile materials such as cotton, wool, flax, and silk, wallpaper sample books; paint and papering tools; table settings.

certain elem

Another ty and objects are similar in nature. The distinction is based principally on the fact that specimens are usually typical of a class or group of objects, whereas objects do not have to be typical or representative to be classed as objects. A distinctive feature of specimens is that they must be typical of their kind, to be called "specimens."

Another distinction is the fact that a specimen can be any part of an object. Thus you might have a collection of arrowheads, of tool handles of different sizes, or of neck-line patterns over a period of years. Such items are not complete in themselves and are therefore referred to as specimens rather than objects.

A specimen may be defined as *an object which is incomplete or which is representative of a group or class of similar objects.* One of the important advantages of such materials is that a collection of them allows us to classify them into groups, study them, and draw conclusions or generalizations. As Dale points out: "How long would it take you to gather from the world itself the essential information about minerals that is represented in a collection of rocks? It is simple enough to begin to classify, infer, and generalize with the collection before you. The same is true, of course, about any collection of objects and specimens."[2]

MOCK-UPS

A three-dimensional teaching device that has proved particularly useful in industrial and military training programs is the mock-up. The term "mock-up" suggests an imitation of a real thing—which in fact it is—but

[2] Edgar Dale, *Audio-Visual Methods in Teaching*, Dryden Press, New York, rev. ed., 1954, p. 121.

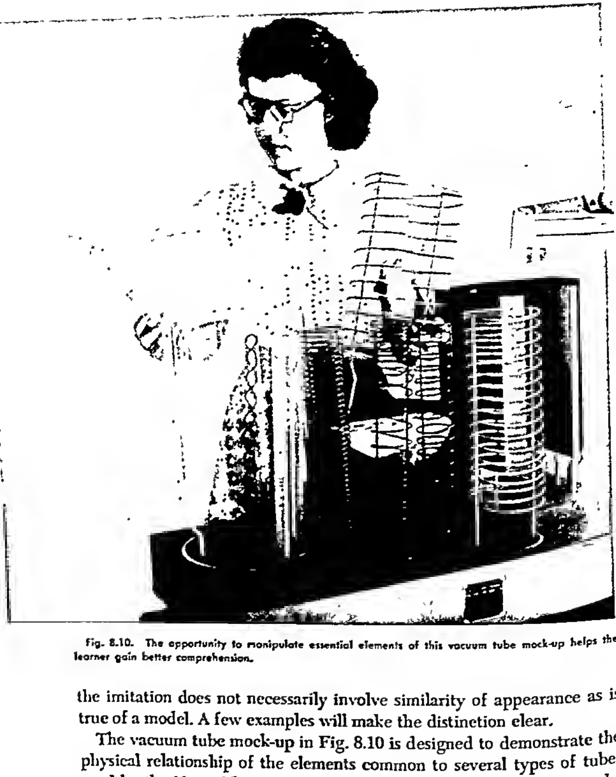


Fig. 8.10. The opportunity to manipulate essential elements of this vacuum tube mock-up helps the learner gain better comprehension.

the imitation does not necessarily involve similarity of appearance as is true of a model. A few examples will make the distinction clear.

The vacuum tube mock-up in Fig. 8.10 is designed to demonstrate the physical relationship of the elements common to several types of tubes used by the Navy. There are three different grids, any of which may be combined with the appropriate filament to illustrate a specific tube design. The mock-up is constructed to a scale approximately eight times the

normal size for good visibility, and the elements are coded in color and labeled for identification purposes.

Note that only the interior of the tube is shown. There is no familiar pronged base or metal cover to identify it. These parts have been omitted so that the radio technician may concentrate on a single important section of a vacuum tube. The real tube, in other words, has been rearranged as well as simplified in order to stress certain elements.

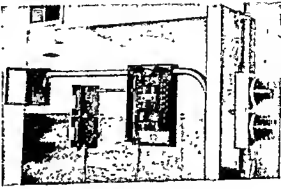


Fig. 8.11. What teaching advantages are presented by this mock-up of an electrical installation?

Another type of mock-up is shown in Fig. 8.11. This is a service entrance wiring and fuse-box installation that includes on one panel all the elements necessary for the lead-in wiring of a home. On the right is the main conduit hooked up to the electric meter; as a rule, the meter box is on the outside of the house. On the front of the panel are the main fuse box and wiring for lights, and auxiliary fuse boxes such as are installed in the basement for connections to electric stoves, water heaters, and furnace fans.

Placing these various elements on one panel makes it possible to show students the complete installation, one part of which is normally separated from the rest by a wall. The student can see quickly just how the installation should be made.

A simple kind of mock-up is frequently used by kinds.
primary teachers when they have their pupils build at schools, the ef-
flower shop (Fig. 8.12), a Santa's toy shop, or a raiamas can be con-
blocks or orange crates. The purpose in this case is tepensive materials.
in coöperative activity, reading readiness, or perhajare good for some
ber concepts. The devices used are mock-ups, hown will do for grass;
elements of the real experience are retained whilenning a comb over a
eliminated. ıge do very well for

Industrially, mock-ups have various practical ad instructions for con-
training. The interior of our luxury airliners is of
sive study of cutaway mock-ups of cabin section.
one-tenth. From these are determined such factors er, 1948, pp. 36–37, and

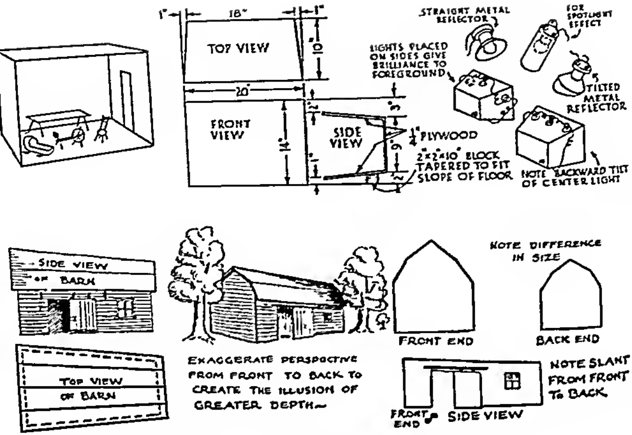


Fig 8.14. *Top:* How to construct a simple diorama. *Bottom:* Perspective in a diorama is achieved by exaggerating size differences from front to back.

USING THREE-DIMENSIONAL MATERIALS IN TEACHING

CLASSROOM USE

A high-school history teacher whose class was visited by one of the present authors on several occasions said: "I would hardly know how to teach history without using the models and objects we have collected over the years I have taught in this school. They seem to help my pupils actually to relive the events and times we are studying. One of the things that pleases me greatly is that many of our former students who have graduated keep coming back to see how our collection is growing."

One had only to watch this teacher at work for a short time to appreciate that her pupils' unusual interest in things historical stemmed in large measure from her own genuine and infectious enthusiasm. She was an excellent teacher.

But her classroom itself also helped to bring history alive. Objects

and models pertinent to the lesson were much in evidence. She utilized pictures and old prints liberally and there seemed to be an interesting story about each one. Objects were discussed in context and examined at close range; all but the most fragile were handled by the students. When questioned about damage and loss of articles, she said that there was virtually none; the students were proud of their collection and treated it accordingly.

Fig. 8.15 What causes the seasons is difficult for the young student to comprehend. How can this student made mock up help in this?

Selection

By this time you will have sensed that objects and models, like other audio-visual materials, should be used when they can make a unique contribution to the lesson. Three-dimensional materials are more real to the student than pictures because they have depth and substance. They can be seen and handled, and sometimes smelled or tasted, thus making for a more complete sensory experience.

Thus in learning situations where the third dimension is important, a suitable model, object, specimen, mock-up or the real thing should be used if feasible. If nothing is available, the possibility of constructing a simple model or diorama is worth considering (Fig. 8.15).

For an English teacher it may be a model of the Globe Theater made from cardboard. For a mathematics class it may be a set of cubes, some spools on a string, a nest of tin cans, or a shoestring and a circle of wood for demonstrating the meaning of π. Stockades, Conestoga wagons, and wigwams are practically standard equipment in the social studies classroom, and most of them can be made by the pupils. With a little help, pupils can easily construct a loom, a papier-mâché volcano, or an oil derrick (Fig. 8.16).

Fig. 8.16. Making a model can be busy work or creative learning. What educational goals are being sought with these two model-making projects?

In all such situations a question to be answered is whether the need is important enough to warrant the time and effort involved in making a model. The same question applies, of course, to collecting specimens and preparing displays. It cannot be answered categorically or in terms of subject-matter learning alone, because, as every experienced teacher knows, the values of such activities to pupils in terms of coöperative experience, individual recognition by the group, and satisfaction in accomplishment may at times far outweigh the value of the information acquired.

Principles of Use

Models have a natural appeal which suggests some ideas regarding their effective use in instruction.

1. *Make certain that all the pupils can see.* Ideally every model would be large enough to be seen easily by everyone in the class at one time. While this is often impractical because of such factors as space, cost, and storage facilities, such materials should be large enough for all to observe the general features, closer examination being left for group and individual study.

2. *Use supplementary materials along with models.* When you use a model of a flower to explain pollination to a biology class you may wish to use a large wall chart for details so that all the class can see it readily. You work back and forth between the two to establish clearly the relationship between parts and functions. At the appropriate point you may also show a sound film which uses animation to visualize the fertilization process. You will doubtless bring in some real flowers for concrete application of the information acquired.

In a word, as with other visual and auditory materials, for maximum benefits you *integrate* the use of models with other instructional materials.

3. *Be sure that correct concepts of size are given the pupils.* One of the dangers in using models is that the pupils may get distorted ideas of actual size unless care is taken to guard against this in teaching.

A curator in the Milwaukee County Museum told of a case which illustrates this point. An intermediate class studying some Polynesian exhibits was particularly interested in a small-scale diorama of a native village. Actual coins used by the natives were included in the exhibit. Since the people in the diorama were only a few inches tall, some of the crude coins were nearly as large as the natives themselves. In evident perplexity a number of pupils asked how the natives managed to carry their money around with them.

One way of emphasizing correct size concepts is by showing the actual object along with the model. Another is by making comparisons with familiar objects. For example, a picture of a large turbine in a power plant can be helpful when used with a small model if a workman is shown in the picture to indicate the relative size of the giant turbine.

4. *Arrange for first-hand examination of three-dimensional teaching materials.* Since one of the major appeals of objects, specimens, models, and mock-ups is their three-dimensional realism, this appeal should be used to stimulate curiosity, interest, and imagination (Fig. 8.17). Unlike pictures, such materials appear differently from every angle and hence should be examined from various points. One of the best ways of providing for this is to have students work directly with the materials.

Further, since the use of models offers an opportunity of providing well-rounded sensory experiences, there is good reason to let the students handle a model as well as look at it. To do so makes the experience more

Fig. 8.17. Do you think that these pupils will have a better understanding and appreciation of pioneer life as a result of working with real things from that period? Why?

concrete, tangible, and memorable to the learner. Some models and specimens are too fragile to permit handling, and their value is somewhat diminished by this fact.

A satisfactory solution of the problem of using small or fragile specimens is a clear plastic mounting in which the specimen is sealed. This mounting makes minute examination possible from all angles without damage to the specimen (Fig. 8.18).

Anyone who has seen intermediate-grade pupils making their own models, or junior- and senior-high-school pupils absorbed concentration on their collections of insects will have little question of their ability to handle models and specimens with care. There seems to be little reason

for having these valuable tools of instruction if the students are not allowed to handle them.

5. *Show only such models and other three-dimensional materials as apply to the work at hand.* Storage problems frequently lead to classrooms being cluttered with all manner of objects, specimens, and models. At the proper time they are hauled down, dusted off, used, and then put back on the shelf for another semester or year. Too often these collections are in full view of the students at all times, distracting attention and lessening their effectiveness when used for instruction.

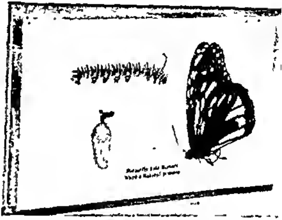


Fig 8.18 Transparent plastic mountings like this permit the examining and handling of fragile specimens without damaging them.

While some materials like aquariums, terrariums, and globes lend themselves well to continuing observation and interest as part of the classroom environment, the great majority of teaching materials are unsuited for this purpose. The enterprising teacher sees to it that they are stowed away out of sight until the psychological moment arrives for using them. He realizes that their interest value is thereby greatly enhanced and that attention can be focused more effectively if unrelated materials are not visible.

Like a good merchandiser, the teacher knows that he must catch and hold his pupils' attention before he can "sell" his ideas effectively. Some teachers cover the glass in their classroom storage cabinets with colored drawing paper, others ask the art department to use this space for simple, appropriate designs which have a decorative effect without being distracting. When no cabinet or other storage space is available in the classroom, cartons or boxes may be used to store three-dimensional materials between uses.

USE IN DISPLAYS AND EXHIBITS

Aside from the classroom itself, three-dimensional materials are most widely used in educational displays and exhibits. Although we are inclined to think of displays and exhibits primarily in connection with

retail selling, museums, trade shows, and fairs, they have many useful applications in schools as well.

Most schools have Parents Nights, Hobby Shows, or annual exhibits of some kind. Vocational schools and technical high schools make regular use of displays to show the work done by various departments. Most of the newer elementary and secondary school buildings have built-in display cases in the corridors for educational exhibits during the school year. In all of these, three-dimensional materials play a prominent part.

Display and Exhibit Defined

Though used interchangeably, the terms "display" and "exhibit" differ in meaning. The word "display" is used widely to denote newspaper or magazine layouts, posters, painted signs, and arrangements of merchandise as in window displays.

An exhibit, on the other hand, is primarily educational in function and nature. A further distinction is that three-dimensional materials are used more extensively in exhibits than in displays. Commercial firms regularly present outstanding educational exhibits at fairs and various trade expositions.

In summary, *a display is an arrangement of primarily flat materials in a conspicuous location, designed to interest, influence, and possibly inform those who see it.*

An exhibit is an arrangement of primarily three-dimensional materials designed to inform the observer about a subject of educational significance (Fig. 8.19). Note that an exhibit may include posters, charts, graphs, and pictures; it may incorporate such devices as motion pictures or recorded lectures. Its essential physical characteristic, however, is a visual impression of realism created in substantial measure by three-dimensional rather than flat materials.

Preparing a School Exhibit or Display

How do you go about preparing a display or exhibit?[4]

1. *Establish your purpose.* As in any other educational endeavor, you must know first *what* you wish to accomplish and then plan *how* it is to be done. Bruno Gebhard of the Cleveland Museum of Health gives this sound advice:

[4] See pp. 542–544 and 550–551 for sources of display and exhibit materials.

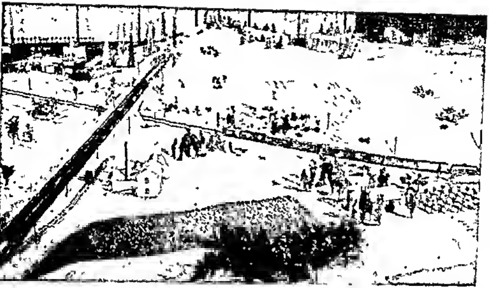


Fig 8.19. How would you analyze the appeal and the learning values of this model railroad exhibit in the Museum of Science and Industry?

Exhibits are too often made with a minimum of clear thinking and planning. A vague idea is not enough and even a splendid one needs much detailed work. You would not dare to face a microphone without a script or film a motion picture without a scenario. Treat your exhibit with equal respect. Put down its purpose in writing; describe the basic idea; be specific about the facts and figures to be used; the technique by which they will be shown. Your manuscript should also include complete copy. . . .[5]

2. *Make a plan.* Your second step is to carry the plan to the "blueprint" stage. Work it out on paper, showing measurements, design to be followed, color scheme, lettering, and placing of materials. The art teacher can help you here, because effective exhibits and displays always incorporate sound art principles. One of these involves simplicity, another design or arrangement, and a third color.

As to *simplicity,* McDougall has a suggestion worth remembering: "Poster and display work go hand in hand. A poster must not be loaded with copy. The poster and display must convey one central idea. If you have more to say, put it in another exhibit."[6]

[5] Bruno Gebhard, "How to Make and Use an Exhibit," *Exhibits—How to Plan and Make Them,* National Publicity Council for Health and Welfare Services, New York, 1948, p. 5.

[6] Kenneth L. McDougall, "Tips for School Exhibitors," *Minnesota Journal of Education,* May, 1950, p. 23.

The *design* itself should be simple. Basically designs are merely arrangements of various lines which lead the eye where you want it to go and at the same time produce a pleasing overall effect. Notice the effect of the good and bad arrangements in Fig. 8.20.

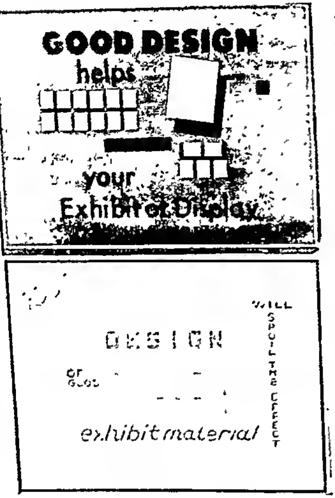


Fig 8.20 The same principles of arrangement apply to both exhibits and displays. Here are a few cues that may be helpful.

Color is an important factor in any display or exhibit. It can be used for such purposes as attracting attention, showing boundaries, indicating classifications and groups, and providing effective backgrounds for materials and lettering. Along with lighting and good design, color is regarded as fundamental by professional exhibitors such as the New York Museum of Science and Industry: "From our experience here at the Museum we have found that the three part formula of sound architectural design, proper use of illumination, and good color effects, is the first essential of good exhibition practice."[7]

The color wheel (see plate facing page 217) is helpful in working out effective color harmony. In any typical color wheel the colors directly opposite each other are complementary and work well together. Likewise any three colors equidistant from one another on the wheel provide a pleasing three-color harmony. The artist varies these combinations by adding black to one of the colors (muting) or adding some white (softening).

All of us are familiar with using certain colors to represent specific occasions or ideas—yellow for sunlight, white for purity, orange and black for Halloween, yellow and violet for Easter, and red and green

[7] *Exhibition Techniques*, New York Museum of Science and Industry, 1940, p. 19.

tion of light is very great where the task is to draw and hold attention."[9]

The use of expensive and intricate lighting for school exhibits is neither practical nor necessary. The fixtures in the average school that has an auditorium stage can be used to advantage for special occasions. A few spotlights and a floodlight or two will do much to add interest to an exhibit that extends around a gymnasium. When exhibit cases are located in corridors, a fluorescent fixture concealed in the case increases the attention-focusing power of the materials displayed. If you want to experiment, you can get pleasing effects by using colored gelatin sheets over the light. Since fluorescent light is "cold" light, no danger of fire is involved.

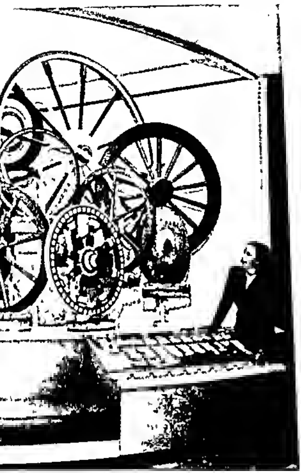


Fig. 8.21. Exhibits which provide opportunity for observer participation heighten interest and opportunity for learning. Pushing a button lights up the appropriate panel and makes the wheel turn.

Display boards located on inside corridors or in dark corners of classrooms need lighting to be effective. A shaded fluorescent fixture at the top of such a board is a good way of lighting the display surface evenly.

3. *Provide for viewer participation.* The most effective exhibits frequently involve the viewer in some type of participation activity. Exhibits in the Chicago or New York Museum of Science and Industry, in which the viewer pushes a button or turns a knob to make something happen (Fig. 8.21), are extremely popular. Anyone who has visited the American Museum of Atomic Energy at Oak Ridge, Tennessee, will not easily forget the part of the tour in which he can have a dime bombarded with neutrons so that it activates a Geiger counter, after which it is returned to him encased in a souvenir

[9] *Exhibition Techniques*, p. 68.

plastic disk. Similarly, a driver-reaction test exhibit (Fig. 8.13) always has people standing in line at an automobile show.

The value of viewer participation in an exhibit is based on familiar principles of learning. Experienced teachers know that pupil activity is closely related to learning and to retention of what is learned.

4. *Carry out your plans.* Planning is the key to a good exhibit or display. It takes time but is well worth it. When you put your plan into effect you can proceed with assurance and a minimum of waste motion.

Your students should work with you on the planning from the beginning in most instances; with a little help here and there they can carry much of the load. Helping to put on an exhibit offers another good opportunity for valuable learning above and beyond significant gains in factual information. The greatest profit for all, however, is derived from an exhibit which is planned and executed in terms of sound and effective educational principles.

SUMMARY

Much of the effectiveness of direct concrete experience in learning comes from the fact that such experience involves a well-rounded use of the physical senses. Although first-hand experience is impossible or impractical in many teaching situations, important segments of reality can frequently be brought into the classroom by means of models, objects, specimens, mock-ups, and dioramas.

These three-dimensional materials can help to make the learning situation more real, lifelike, and interesting to the student. Furthermore, they are frequently an improvement on reality itself. A model of the solar system or of a one-celled animal, for example, reduces the vastness of the former and enlarges the microscopic proportions of the latter to a size which can be seen and studied. Cutaway models provide interior views of objects which ordinarily cannot be observed. Among their other useful characteristics, models have the realism of three dimensions, they are usually simplified, important features are made to stand out clearly, and many models have removable parts.

Models are defined as recognizable three-dimensional representations of real things; objects are the actual things. Specimens are objects or parts of objects that are typical of a class or group of objects. A mock-up is similar to a model but is distinguished by rearrangement and conden-

plastic disk. Similarly, a driver-reaction test exhibit (Fig. 8.13) always has people standing in line at an automobile show.

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sation of essential elements so that they can be studied more readily. A diorama is a three-dimensional scene made with miniature objects and backgrounds.

In order to use three-dimensional teaching materials effectively, it is of primary importance that they be seen clearly and examined from various angles. Students should accordingly be permitted to handle and work directly with them whenever possible. The instructor must be careful to avoid giving the class distorted size concepts when models are used. As in all effective teaching, he should integrate pertinent materials in terms of lesson needs. In general, three-dimensional materials should be stored out of sight when not being used for actual instruction.

Displays and exhibits are other highly effective means of using three-dimensional materials. Although good educational exhibits require careful planning and the application of artistic principles governing arrangement, color, and lighting, they can and should be coöperative projects in which the students participate actively. Here too, as in the construction of dioramas and the use of other three-dimensional materials, valuable concomitant learning can take place in addition to the information gained concerning the particular subject.

Suggested Activities

1. Analyze a course of study in your teaching field and prepare a list of appropriate models, mock-ups, dioramas, objects, and specimens for use in it.
2. Have a committee prepare a list of sources of three-dimensional materials which are supplied free or on loan to schools. Ask your teachers for suggestions and check such sources as the Educators Guide to Free Instructional Materials and local libraries and museums. Organize the list in terms of subject areas and grade level and have it duplicated for distribution to the class.
3. Inspect a number of effective window displays in your community and analyze them in terms of arrangement, use of color, and lighting. Take pictures if possible, and make simple sketches of the layout plans. Show these by means of an opaque projector when reporting to the class.
4. Prepare a report on the display and exhibit facilities of a school building. Include tackboards and exhibit cases in the halls and classrooms. Evaluate your findings and make recommendations for practical improvements.
5. Divide the class into committees and have each committee plan an exhibit for future use in the school. Among the possible subjects are National

Education Week, civil defense, conservation, gardening, seasonal sports, hobbies, educational or vocational guidance, and units of school subjects.

6. *Storing three-dimensional teaching materials* is a constant problem in many schools. Visit several schools in your community and gather information on how this problem is handled. On the basis of your findings, list practical suggestions for solving it.

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Model Houses, Color, 5½ min., International Film Bureau, Inc.
Museum of Science and Industry, B&W, 14 min., United World Films.
Museums for School Children, B&W, 21 min., United World Films.
Teacher as Observer and Guide, B&W, 22 min., Columbia University. (First 7 minutes most useful here.)

9.

Community Study

OUR SCHOOLS, PHILOSOPHERS HAVE SAIO, ARE ORGANIZED TO HELP PREpare youth to take their places effectively in community living. Yet in too many cases school experiences are organized in situations entirely apart—within the confines of the four walls of the classroom, apart from any first-hand experience with the community in which the student will later live his life and make his living.

Consider the objectives of education:[1]

1. The development of self-realization: To know, to express oneself, to appreciate the life about one, etc.
2. The development of human relationship: To respect one's fellows, to coöperate, to achieve friendly relationships in school, home, community, etc.
3. The development of human efficiency: To know about work and occupations, to gain a living, to plan spending and saving wisely, etc.
4. The development of civic responsibility: To achieve social understaoding, to participate in school and community affairs, to achieve understanding of and devotioo to democratic ideals, etc.

Taken in their composite meaning, these four purposes describe *the goal of education as helping youth become effective participating citizens in home, school, and community life.*

While there are many ways through which these objectives may be achieved, certainly there should be included ample opportunity for the

[1] Educational Policies Commission, *The Purposes in American Democracy*, National Education Association, Washington, 1938. See also Harl Douglas, *Education for Life Adjustment*, Ronald Press, New York, 1950, p. 10.

learner to observe, to study, to participate in and ask questions about the community activities that he is fitting himself to enter.

How can the community be known and understood better than by observing it first-hand? Yet observations of existing school practices often reveal that much remains to be done. For example:

The children in the tenth grade were hard at work studying the subject of local government. The teacher asked, "How many of you have ever attended a meeting of the common council?" Not one hand went up.

The teacher tried again. "How many of you have visited the central water-pumping station?" A few hands were raised. Most of the children admitted having been curious about the place, but they just had not got around to visiting it.

Within the past three years, however, this same group of thirty-six young people had "studied" the relationship of tho earth to the solar system. They had traced the story of mankind from the dawn of history to the present. They had read about the "type" countries of the world, and they could relate interesting and unusual bits of information about the Watussi and Mangbetu tribes of central Africa.

These children had spent hours studying about people and things that are thousands of miles away. This is desirable, but it is also desirable that the school curriculum of today no longer ignore the local environment.

In many cases the situation just described is the outgrowth of inertia which is inherent in our own teaching procedures. This inertia results from the fact that some teachers unquestioningly accept the orderly, systematic curriculum plan handed to them by a higher authority, and in their classroom work and study they depend too completely on easily accessible materials.

As we contemplate the many sources of information presented by the immediate community, we must include those within walking distance or a short bus trip, or those that can be brought right into the classroom, either in person or by mobile demonstration.

The local factory, the retail store, the business office, the packing plant are real. School children can see them, hear them, ask questions about them, examine them minutely. The banker, the returned traveler, the city official are often willing to come to the classroom and be interviewed by the pupils.

If we believe that first-hand experiences with people and things are primary sources of learning, we must arrange to investigate systematically the resources of local communities as part of the organized school curriculum.

MEANING AND SCOPE OF COMMUNITY STUDY

COMMUNITY STUDY DEFINED

Community study describes learning situations through which learners come into first-hand contact with the people, places, and things all about them. It includes visiting, interviewing, participating, listening, seeing, examining, questioning, often learning by doing, and gaining understanding about the things, processes, services, and social activities that make up the stream of community life.

Fig. 9.1. The village baker leaves his shop and becomes a "first-hand learning experience." What responsibilities are here assumed by members of the community? By the school administrator? By the teacher? By pupils?

There are two main avenues of community study. People or things representative of desired community activities may be brought to the school (Fig. 9.1), or the class or some of the children in it may visit definite community situations to study them first-hand and relate them to the classroom activities (Fig. 9.2).

Through community study the scope of the classroom is enlarged to encompass areas of the community that *need to be investigated and understood.*

Community study makes seeing and hearing realistic and exciting avenues for learning. But time must be provided for reflective thinking, planning the next steps, and further study. Finally, community study experiences may become the basis of individual contributions to group projects. The relief model in Fig. 9.3 will be a record of the class's knowledge and accomplishment.

The literature on community study describes variations which have

Fig. 9.2. The nature of the community study experience will determine how it is to be used. What teacher responsibilities are apparent in this situation?

as wide range as the accounts that are given about them. Community study reports include national caravan tours, youth hostel excursions, and world tours which, as their descriptions reveal, are only casually associated with the school's total program of planned educational experiences that should be available to all the children. Other reports describe community study as it is presented here, as the *formally designated part of the school program which extends the classroom into the community or brings the community into the classroom in order to give all the learners increased experience with real things*—real things which relate to the curriculum plan.

The names used for community study vary as widely as the descriptions of it. Most frequently used are school journey, excursion, field trip, tour, school visit, etc. In this chapter community study will be presented in terms of school-authorized, teacher-planned, curriculum-inte-

Fig. 9.3. What outcomes of community study are apparent in this situation? What relationships exist between these activities, community study experiences, and the achievement of tool subject skills?

grated experiences during which things, services, and processes in the community that are related to curriculum plans are studied by pupils under teacher supervision.

SCOPE OF COMMUNITY STUDY

One of the great inconsistencies of our educational planning is the fact that a child, on reaching the age of six, is placed in an environment which often restricts his natural inclinations. This child has spent the first five years of his life wiggling, crawling, manipulating, investigating, and exploring endlessly. Suddenly he finds himself "in school," restricted to the confines of a chair or desk. This situation is one of the anachronisms of educational planning.

To expect the six-year-old to conform to the restricted environment of a classroom for five hours a day, five days a week, is to run counter

to all we know about his mental, emotional, and physical make-up. This child should be allowed to pry into every corner of his environment as he participates in carefully planned, school-controlled community study experiences. Instead of being confined to the four walls of a classroom, he should be "free" to investigate his "world": the school yard, his friends' homes, the business district, and the open country outside the area he lives in.

The "schoolroom" for this child should include the caterpillars in the school shrubbery, and the small stream with its myriad wonders—water plants, the wriggling insects and pupae, tiny fish, and the sparkling crystalline rocks and stones on the stream bed. The school day should include "talks" and "visits" with community helpers—the mailman, the fireman, the policeman, and the people who are engaged in laundering, dairying, breadmaking, poultry raising. These "near-at-home activities" with which the child comes into such constant contact as he eats, dresses himself, keeps himself clean, and responds to his parents, teachers, neighbors, and other children his own age are subjects for community study.

As the curriculum becomes more remote, local evidences of faraway places may be subjects for first-hand examination. For the child who is studying the cultural patterns of far-off lands, what better way is there to begin community study than as one fourth-grade social studies teacher does—in the trailer factory?

There the children examine a trailer chassis. At first glance, a trailer is a massive thing with bright-colored paint and new black tires. But more detailed investigation reveals that this great piece of mechanized equipment is not a single thing, a trailer; rather it is the sum of many parts. Its panels contain tin and molybdenum from the Malay Peninsula. The fabric of its tires is made of jute and hemp from the Philippines. The rubber itself may come from South America, Indonesia, or India. The paint ceases to be solely color but is seen to be a combination of tung oil from the Orient and iron oxide from the Mesabi Range. The tough stout oak in the frame and cab opens the way for questions about white oak lumbering in the Middle West. Five-ply light pine panels represent the lumber industry in the forests of upper Washington.

As this teacher said, "Our community study opens vistas which demand the investigation of the world itself."

In the upper grades various subjects—mathematics, chemistry, physics, and English—may be motivated and made increasingly real by local study arrangements. Thus youthful chemists are taken to the air-reduction plant and to the coal-tar industries in the nearest industrial center.

Young mathematicians, pondering the utility of the formulas and geometric relationships they are studying, need to examine leaf structure, the triangular prismlike form of a conifer needle; the intricate maze of angles, supporting beams, and other members of a railroad trestle; and the form and reasons for setbacks in architecture.

The student of English or communication finds substance for themes in every investigation he makes. He can use this information later in class discussions, in writing advertising copy, or in creating a radio newscast.

The idea of community study is not new. Among the first modern educators ordinarily acknowledged as presenting logical arguments for local study were Pestalozzi, Herbart, and Froebel. They reiterated their views about learning again and again: *Learning experiences which are real, lifelike, and available to the learner for first-hand scrutiny, questioning, and recognition are likely to be the most effective avenues through which children become informed about their social and natural environment.*

The immediate community often provides extremely dynamic, interesting, real-life opportunities for learning. It is the responsibility of the administrator and teacher alike to investigate the community, particularly those resources which seem to identify themselves with a more clear-cut and fuller understanding of formal school experiences.

PLANNING CLASSROOM COMMUNITY EXPERIENCE

New ways of arranging for community study opportunities have recently been investigated. In Manhasset, New York, the "world" of the community has been divided into experience opportunities which call for the student to observe outside the classroom, and opportunities *which can just as easily be brought into the classroom.* Both, needless to say, are important, because they complement each other. Is it not logical to expect that communities which originally authorized the creation of a public-school system to prepare youth for community participation should welcome the incorporation of first-hand observation of the community as a part of instruction? If this kind of instruction is to be successful, both lay and professional workers who are qualified should help.

Thus, a committee of interested parents and teachers set about to survey the Manhasset community's resources: *people and their specific skills and knowledges*. This committee sought to discover the true wealth of the community in terms of the people in it.[3]

The committee began by interviewing professional and business people to discover what skills and abilities they had that would enrich learning situations in the classroom. This information was then catalogued for reference by interested teachers. In this way the committee discovered, for example, that a very able lawyer could be available when the social studies class was investigating personal rights and the techniques and procedures of court action. The local nurseryman who had developed certain grafting techniques would explain them to general science students. A local ceramist was willing to explain and demonstrate glazing techniques to the art class. The local music store proprietor, a skilled cello player, was willing to help the members of the school orchestra who played that instrument.

The teacher is skilled as a student of child psychology, of classroom method, and of modern techniques for providing educational experience, but he cannot be expected to know the intricacies of community life and activities as well as others do. With the increasing complexity of the modern world of information, every teacher should welcome useful learning experiences that can be supplied by the resources of the community, its people and their skills (*Fig.* 9.4).

In every situation *the teacher must be the one to decide when a community resource experience of this nature should be incorporated into the classroom program*. He must be the one to invite, to plan with the class in anticipation of the experience, and ultimately to evaluate its success or failure. This kind of school and community coöperation under proper teacher initiative and guidance offers unlimited enrichment possibilities.

There are variations of this Manhasset community resources program. Thus on school career days, local professional men, craftsmen, and tradesmen come to school to present to interested pupil groups first-hand accounts of their particular role in the community and to answer questions. Other schools have community days, when parents attend homeroom sessions and discuss community responsibilities with students.

[3] *The World in a Schoolroom*, Sound, B&W, 20 min., United World Films.

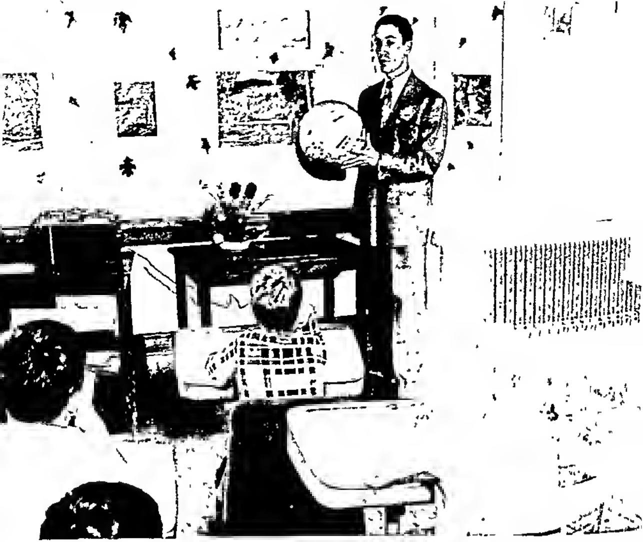

Fig 9.4. A parent, recently returned from abroad, describes the people he spoke with and the places he visited. Is the parent or the teacher more responsible for what takes place in this situation?

Selecting and using resource opportunities in the immediate community can provide enrichment which the teacher, regardless of his broad training and effective work, is frequently unable to provide.

PLANNING OUT-OF-SCHOOL COMMUNITY STUDY

Most teachers readily agree that if they are to help the student achieve his goal of community membership, they must arrange for him to observe community life and activities at first-hand. To provide appropriate opportunities of this type is a primary goal of out-of-school community study.

But because they are not sure of the reaction of the administrator, the school board, or the community to plans for leaving the classroom for study, teachers often avoid such opportunities. Thus, the responsibility

for making community study a going part of classroom activities often rests with the community itself, the school board, and the school administrator.

For this reason the board of education of a midwestern city saw fit to encourage community study in its schools by adopting the following resolution: "In order to provide the most effective teaching environment, field trips and excursions outside the classrooms and school buildings and grounds under the supervision of members of the school staff are considered by the Board of Education as an extension of the classroom and an integral part of the educational program."[3]

In the bulletin giving his interpretation of this resolution the superintendent said, "The purpose of this resolution is to remove any possible doubt regarding the fact that local study is a legitimate part of the educational program and will be recognized as such by the administration and the Board of Education. In the case of injury to a child, it protects the teacher from any charge that the trip was not in the line of duty and was not a part of the regular school program."[4]

The impetus such a statement gives to a community study program is obvious. Bonded transportation facilities provided by the school bus line or by a local transportation company remove other possible barriers to the execution of such a program. The limits of the environment that can be explored by the children are as broad as the school day itself, which may range from 9:00 A.M. to 4:00 P.M. Good roads, modern transportation, and careful planning can enlarge the school's study and learning environment to a radius of as much as 100 miles, with the school as the center of the circle.

LOCATING USEFUL COMMUNITY STUDY SITUATIONS

A systematic search for community study opportunities is usually the first step in beginning a program. Such plans may be discussed during faculty meetings, P.T.A. planning sessions, or teacher-principal conferences. In one such conference a third-grade teacher told the principal that when she suggested that her pupils visit a dairy during their study of truck and dairy farms, the children told her that they had already been to one. Investigation revealed that not only had they been taken

[3] *Bulletin 69*, Madison (Wis.) Public Schools, June 9, 1943.
[4] *Ibid.*

to one of the local dairies, but they had visited the same dairy in kindergarten, in the first grade, and again during the second grade. This led to the teaching staff's decision to conduct a status survey of existing local study practices.[5]

The teachers of the six grades asked each of their pupils what community study experiences they could recall. The first step in the study was to tabulate the frequency of these pupil-recalled experiences. This revealed that in many cases a given community situation had been visited by school children at every level, kindergarten through sixth grade. Again the most notable case of duplication was the visits to a local dairy. The dairy in question not only was willing to supply transportation to any teacher-pupil group but at the end of the "study visit" distributed generous samples of ice cream, chocolate milk, etc. A similar situation was revealed in regard to the neighborhood bakery and a candy store. Needless to say, many purposes other than purely educational objectives were behind the repetitious study visits to these three community resources.

The teaching staff decided to do two things: (1) to survey community opportunities for study, and (2) to examine community situations in terms of the degree to which the various work units could be enriched through selected local study opportunities.

A young child may gain one type of experience in a given community study situation. But this same child, two or three years later, may investigate the identical study situation from an entirely different point of view and in search of a new set of outcomes. Accordingly the teaching staff recognized that visits to some community situations may be repeated if circumstances seem to warrant it.

One year later, as a result of this teacher-inspired investigation of community resources and their relationship to units of study in the elementary grades, the following list was drawn up. In each case selected local study situations are paired with the units of study to which they relate. No study situations were assigned to more than two grade levels.

Local Study Situation	Unit of Study
Grade 1	
Animal hospital	Pets
Arboretum	Spring Changes

[5] From the experiences of one of the authors as an elementary-school principal and supervisor of curriculum in the Madison (Wis.) public schools.

Local Study Situation	Unit of Study
Chicken hatchery	Pets
Seed store	Gardens
Toy shop	Toys
	Grade 2
Bakery	Bakery
Dairy farm	Dairy
Fire station	Fire Department
Flower shop	Flower Shop
Fruit and vegetable market	Grocery
Greenhouse	Flower Shop
Grocery	Grocery
Post office	Post Office
Zoo	Parks—Zoo
	Grade 3
Cheese factory	Farm—Truck and Dairy
Lumber company	Tree Friends
Neon light shop	Light
Truck farm	Farm—Truck and Dairy
	Grade 4
Apiary	Insects
Arboretum	Trees of Our State
Biology building exhibits	Bird Friends Insects Wild Flowers and Plants
Game and Fur Farm (Poynette)	Animals of Our Fields and Woods
	Grade 5
Airport	Transportation
Bus barns	Transportation
Fish hatchery	Fish
Forest Products Laboratory	Forests of the United States
Historical museum	Transportation Changes in Schools
Post office	Communication
Quarry	Rocks and Soil
Radio station	Communication
Railway station	Transportation
Streamliner train	Transportation

Local Study Situation	Unit of Study
Telegraph office	Communication
Telephone company	Communication
Waterworks	Water
Weather bureau	Weather
Zoo	Wild Animals of Our Country

Grade 6

Bookbindery	Story of Books and Records
Canning company	Industry Through the Ages
Capitol	Story of Government
Coca-Cola Company	Industry Through the Ages
Condensery	Industry Through the Ages
Courthouse	Story of Government Architecture Through the Ages
Factory—Scanlon-Morris	Industry Through the Ages
U. W. Geology Museum	Prehistoric Animals Plants Through the Ages
Historical library	Story of Books and Records
Newspaper office	Story of Books and Records
U. W. Observatory	Stars and Constellations Solar System
Packing plant	Industry Through the Ages
University of Wisconsin and Capitol Square	Architecture Through the Ages
Voting center	Story of Government

A coöperative study[6] of field trip opportunities in Dearborn, Michigan, reflects what the combined efforts of many interested teachers can accomplish. The teachers in that community pooled their field trip plans. If a field trip was judged to be successful as a learning experience, essential information about it was reported.

Summaries of these reports were made available to all the other teachers. The following is a typical summary report of a field trip to a meat-packing plant[7]:

Place: Detroit Meat Packing Company.
Address: 1120 Springwells, Detroit.
Person to contact: William Hill. *Telephone:* Vi. 2-3500.

[6] William G. Hart, "Field Trip Handbook," *See and Hear*, January, 1951, p. 20.
[7] Marshall Becher, *Field Trip Handbook*, Dept. of Audio-Visual Instruction, Dearborn Public Schools, p. 156.

Objective: To see how livestock is slaughtered and the meat made ready for the market.
Things to see and do: Class will be shown cattle, hogs and sheep being herded into yards. They come by truck and railroad cars. You will see cattle, hogs and sheep as they are slaughtered, dressed and placed in coolers. All refuse is saved and made into by-products. Group will be shown how meat is cut into halves and quarters, how certain parts are made into cold meats, lard, etc.
Teaching aids: Film *The Cattleman.*
Observations en route: The Ford Motor Company.
Age of pupils permitted: 15 years and up.
Suitable for grades: Ten, eleven, and twelve.
Number of pupils: Not over 15.
Days and hours to visit: Tuesday and Friday. Make arrangements about five days in advance.
Traveling time one way: 20 minutes.
Directions to get there: Take Schaefer Road to Dix, turn left on Dix to Springwells, right to 1120 Springwells.
Parking accommodations: Ample in plant parking lot.
Guide service: Guide will be assigned by Mr. Hill.
Admission fee: None.
Remarks: Tuesday and Friday are best days to visit. Activities vary from week to week. Hence arrangements are more liable to function if date is confirmed four or five days in advance.

Local study opportunities vary from community to community. The opportunities which the teacher in an open rural area has are only slightly related to those of a teacher in a crowded metropolitan center. However, it is just as desirable for the rural group to have study experiences in a metropolitan area as for the children in crowded city schools to experience being in the open country.

Community study opportunities are available to every school and should be explored.

TEACHER LEADERSHIP IN COMMUNITY STUDY

Following the investigation of community resources and the correlation of local study opportunities with specific units of study, each teacher is confronted with certain responsibilities that must be met during community study. The following are typical:

1. Preliminary preparation.
2. Preliminary discussion of study objectives.

3. Observation.
4. Follow-up discussion and evaluation.
5. Follow-up projects growing out of community study.

To illustrate these responsibilities, we shall assume that the teacher and pupils are about to begin a study of air transportation. They will have a variety of ways in which to discover the meaning and relationships of air travel and its effect on people and the community. They will need to select activities through which understandings can be gained. Books, pictures, films, interviews with air personnel, pupil experiences, slides, air charts, a visit to the airport—all may be discussed. It will be assumed that a trip to a local airport is possible near the beginning of the unit as a means of gaining understandings that will be highly useful in continuing the study of air transportation. In order for this experience to produce results, the teacher should vary his usual classroom planning.

PRELIMINARY PREPARATION

Usually the teacher visits the airport beforehand. If after this preview he believes that the airport will provide a valuable learning experience for the class, he proceeds with further planning.

As much responsibility as possible should be given the children. In terms of their age and level of maturity they can assume certain responsibilities, such as the following:

1. The children should, if possible, invite the airport manager, a stewardess, a pilot, a ticket agent, a freight agent, to come to their classroom and help them plan their visit. If this is not possible, they may telephone or write the airport manager, asking to visit the airport, arranging a time, learning about behavior during the visit, etc.
2. The children should write letters to their parents and the principal telling of their plans, route, purposes, etc., in connection with the trip. Both parents and administrator should be notified that the children are leaving the school building.

The teacher should decide which is the safest route. If transportation is needed, the school bus should be used. However, if private passenger cars are used, they should be adequately covered by passenger liability insurance. Whenever possible, bonded carriers—usually buses—should be

engaged. They should be told exactly when to pick up the children at the school and should discharge them in a designated safety zone at the airport.

PRELIMINARY DISCUSSION OF STUDY OBJECTIVES

As in beginning any new unit of study, preliminary discussion of a proposed community study will assist the children in developing definite purposes and will arouse their curiosity and interest in the experiences, understandings, and factual information they will acquire. Such discussion will give them an opportunity to discuss information they already have. It will also reveal inaccurate or purely imaginary concepts and ideas about the local study situation.

On the basis of what the children already know and of what it is hoped they will learn, teacher and pupils should plan what they hope to achieve as the result of their visit to the airport. Their objectives may include:

1. To learn how weather information is used by the airplane pilot.
2. To find out about the cost of passenger travel, the distance to given destinations, and the time required to reach them.
3. To learn more about the duties of the stewardess.
4. To find out how airmail and air express are handled.
5. To find out what makes an airplane stay in the air.
6. To find out about gasoline consumption, cost of operation, etc.
7. To learn how the airport serves the community.

More subtle purposes may have to be suggested by the teacher. Such purposes include seeing who can "unearth" the most unusual information, who can be the most courteous, the most completely responsible for his own good behavior, etc.

Every new area of study imposes a certain specific vocabulary responsibility. Hence the teacher will consider in advance any new or unusual vocabulary items that will influence the opportunity for more complete learning during the visit. In this case these terms may well include "ceileometer," "alto-cirrus," "cumulus," "anemometer," "beam," "c.v.u.," "teletype," "omni-range radio," etc.

While these words may be high up on any formal word-count list, the need the children feel to know them and the interest they show in attaching significance to them make them necessary new vocabulary items.

Fig. 9.5. The word "clouds" takes on many new meanings as these students fly through them and observe cloud formations from above.

Pre-study and discussion of terms that are essential for complete learning in the situation will give the children increased opportunity for attaching meaning and understanding to their contemplated real experiences.

The combination of anticipating learning problems and being given a clear-cut and definitive statement of the objectives to be achieved is the best preparation the learner can have in advance of the actual visit.

OBSERVATION

While the students are at the airport, they must be encouraged to be alert in finding answers to the questions they want answered. It is impos-

sible to anticipate all the questions the children will ask at the airport. For this reason every child must realize that he is expected to ask questions and to investigate what he sees as he goes from weather station to control room. A teacher soon learns to anticipate a student's need for further explanations.

Note taking should be encouraged. When possible, take along a cam-

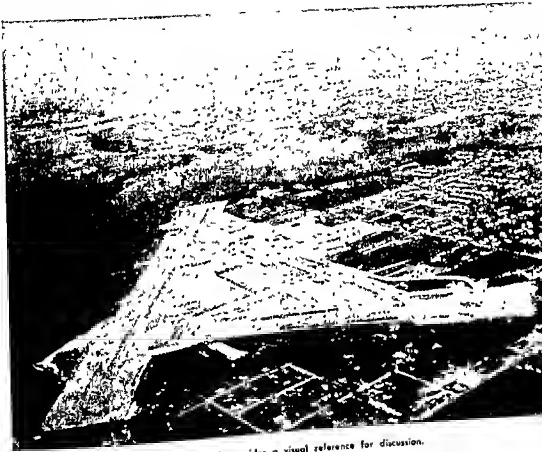

Fig. 96 This airport photograph provides a visual reference for discussion.

era and photograph complicated airport equipment and procedures so that these pictures, or slides made from them, may be examined and discussed in the classroom.

Once the student is back in the classroom, his impressions of a field trip may be marred by several things. Noise and confusion may have interfered with complete understanding. Other mechanical problems such as space or lighting may have blocked it. Haste imposed by the necessity

of meeting time schedules may have made it possible to have only a fleeting glimpse of an important operation or piece of equipment.

FOLLOW-UP DISCUSSION AND EVALUATION

After the trip, classroom discussion should be encouraged. This, of course, is one kind of evaluation technique. Other outcomes of the visit include written descriptive accounts, letters to friends describing experiences at the airport, news releases for the class or school newspaper, letters of appreciation to the airport personnel, graphic or pictorial records of aircraft, equipment, etc.

Objective tests of the completion or true-false type prepared by teacher-pupil coöperation are very helpful in analyzing outcomes.

FOLLOW-UP PROJECTS

After their discussion of experiences at tbe airport, the children may have new questions. Usually a new experience leads to curiosity about countless ramifications of it. Girls may be interested about the work done by stewardesses, boys about meteorology, both about air freight. To answer such questions appropriate persons—a plane stewardess, a weather forecaster, an air freight agent or pilot—*may* be invited to come to the classroom to describe his work, to display materials, charts, and other things that visualize his work, and to aoswer questions or help develop further plans for the class.

Other follow-up plans may encourage the construction of models, mu rals, and study displays. Children interested in building models may correlate problems involviog linear measure, angle construction, and mechanical drawing in a scale drawing and model of the airport. Those interested in science and electronics may wish to investigate directional beams and instrument landing systems.

As the result of other community study situations, it may be possible for student groups actually to participate in projects which benefit the community. One needs only to ride through the reforested sections of the North Central Plains states to see conservation projects that have resulted from field trips. Along the roadway are signs reading "School Forest." Such forests are plantings of young pine trees, usually the result of the school children's study of conservation.

Field trips in the community may create opportunities to participate

in civic affairs. Several worth-while follow-up projects of this sort are shown in the films, *Learning Democracy Through School and Community*[8] and *Our Town Is Our Classroom*.[9] A field trip to the local common council might be followed by the revising of student government election campaign regulations. Visits to local industries lead logically to organizing a school and community vocational guidance plan, under which professional men and representatives of labor and industry come to the school on scheduled occasions to discuss their work and to advise the pupils about vocational opportunities and choice. Civic clean-up campaigns, the erection of safety signals at danger spots, and the provision of recreation centers, play areas, and hostel circuits are additional community study projects of the same nature.

Fig 97. Under what circumstances and how early in the school program should classroom activities be related to community study?

Community study may become the basis for many intraschool activities such as discussion panels, mock radio broadcasts, displays of artwork, and exchange reports with the classroom across the hall. Its most significant outcome, however, is seen when students plan ways in which they as future citizens can participate *now* in making their community a better place to live in.

EVALUATING COMMUNITY STUDY

As was said above, community study should be a carefully planned learning experience. Following it, the teacher should evaluate its success in terms of what was experienced by the children who participated. Such

[8] Sound, B&W, 16 mm, 20 min, Educational Films Service.
[9] Sound, B&W, 16 mm, 18 min, United World Films

items as the following are objective measures of success or failure:

1. This visit or interview was arranged because it was closely related to planned curriculum objectives. Yes .... No ....
2. The experience was worth the time and effort required because it provided useful learning opportunities which could not have been presented by ordinary classroom methods. Yes .... No ....
3. The students themselves became responsible for:
   a. Knowing the purposes for which they undertook the community study. Yes .... No ....
   b. Formulating safe-conduct attitudes. Yes .... No ....
   c. Devising follow-up discussions and evaluation. Yes .... No ....
   d. Initiating follow-up activities. Yes .... No ....
4. The teacher observed all local school regulations concerning community study visits or interviews by:
   a. Previsiting the place to be studied. Yes .... No ....
   b. Arranging time of departure, arrival, and return via school bus or other bonded carrier. Yes .... No ....
   c. Sending study announcements home with children. Yes .... No ....

COMMUNITY STUDY LIABILITY

Teachers may have questions about their personal liability for accidents or injuries to pupils while participating in community study situations.

The commuoity, acting through its representatives, the school board, should decide whether or not community study opportunities are to be provided. School boards and school administrators have the responsibility of establishing policies concerning community study (see p. 252). Similarly, the teacher has the responsibdity of planning for community study situations with the same care he uses in his day-to-day classroom teaching.

The following are the responsibilities which school boards, school administrators, and teachers have in connection with community study experiences.[10]

1. The school board should acknowledge community study as a desirable enrichment experience and an integral part of the school's regular program. (See page 253.)

[10] See also Edward G. Olsen, *School and Community*, Prentice-Hall, New York, 1945, "The Bi-Weekly School Law Letter," February 4, 1954, published by Dean R. R. Hamilton, College of Law, University of Wyoming, Laramie.

2. The principal should make the school board's policy known to the teachers.
3. The school board should provide liability insurance for the teaching staff. In Wisconsin, for example, and in many other states school boards are legally authorized to expend public money for this purpose.
4. The teacher and principal should plan community resource activities which will help to accomplish goals of existing curriculum plans. Such activities should not be confused with festivals, holiday excursions, and other out-of-school class activities of dubious educational value.
5. The teacher, with the principal, should arrange transportation via school bus or other bonded carriers which are required by law to carry liability insurance.
6. The teacher should visit the community resource in advance to determine whether the educational benefits to be derived will make the trip worth-while. Teachers should never assume responsibility for conducting pupils through a plant or industry themselves but should arrange to have the management supply a guide. As soon as the tour is ended, *the teacher should have the pupils return to school immediately*, again by properly insured carrier.
7. The use of the parental permission slip (Fig. 9.8) informs the parent that community resource experiences that take pupils out of the classroom are an acknowledged part of the school program. It allows parents to have their children refrain from this kind of activity, if they wish. But the granting of parental permission does not absolve the teacher who takes his class out into the community, from exercising the same reasonable care he is expected to exercise in the classroom.

The teacher who works within the above suggestions will proceed with confidence and enthusiasm toward achieving valuable school and community relationships.

SUMMARY

Study of the environment in which we live is often overlooked as part of formal classroom activity. This should not be.

A systematic analysis of the community in which the school is located will reveal many valuable opportunities for learning at first-hand. Surveying community study possibilities should be coöperative projects for

Dear ______(Parent's name)______

Because we wish to make your child's experience in ______(Subject or Grade)______ as valuable as possible, we want to give him the opportunity of first-hand acquaintance with things we are studying in the community. We are planning on ______(Date)______ to visit ______(Person or Place)______ as a part of our regular day-to-day study activities.

We encourage only those students to participate in community study activities who prove themselves trustworthy and responsible.

Will you kindly sign below to indicate that you want ______(Pupil's name)______ to participate, and return this letter to me?

Very truly yours,

______(Teacher)______

We wish to have ______(Pupil's name)______ . take part in the community study plans described above. We will discuss with him his responsibilities in this connection.

______(Parent signature)______

Fig. 9.8. Parental consent form for student participation in community study experiences.

teachers in locating local industries, distributive agencies, service organizations, etc., which illustrate social processes and provide values important for implementing the school curriculum. Through parent-teacher-administrator planning, the resources of the community should be assayed in terms of valuable first-hand opportunities to discover useful information.

The community study experience takes two forms. On the one hand, members of the community may come to the classroom; thus a lawyer will talk to a social studies class, a biologist to a natural science class, an accountant to a commercial class, etc. On the other hand, the whole class or certain members of it may visit nearby plants in order to see heavy-industry processes, assembly-line procedures, automatic business-machine operation, etc.

Because of its realism, community study can become an effective first

step in building understanding through real experiences which give additional meaning to subsequent and more abstract learning situations and heighten understanding of them.

The purposes of community study are as follows:

1. To provide opportunity for real experiencing through which to gain valid understandings.
2. To arouse and create interest. Few learners fail to be motivated as they contemplate and examine things, processes, and ideas.
3. To create backgrounds of experience which will give meaning to reading and simple research done later in the more formal study situations of the school classroom and library.
4. To provide backgrounds of experience which will stimulate students later to participate in class discussion, creative art projects, and written communication (writing letters, themes, stories, poetry, etc.).
5. To encourage and develop keenness of observation and care in observation, and insatiable curiosity.
6. To encourage active participation in community planning. Students can plan the community projects that grow logically out of field trip experiences. Such projects serve as bridges which lead from school experiences to community membership.

These purposes are seldom achieved in the absence of careful teacher guidance.

The outcomes of community study are well summarized in the discussion between Mr. Richards, a teacher, and Mr. D., a parent, which occurs in the film *Near Home* (Sound, B&W, 20 min., British Information Services):

MR. D. Well, I'm greatly impressed by all this, Richards. The youngsters have done a remarkable piece of work.

RICHARDS. They enjoy it—it's all I can do to keep up with them.

MR. D. Now, what do you think your youngsters are going to get out of it? I should say you've given them something very valuable . . . what one might call a real objective view of the town in which they live. . . .

RICHARDS. Yes, I knew that was the side of it that would appeal to you! But don't run away with the idea that they understand all this thoroughly—we don't expect them to. But they've been getting a basis of first-hand information that will still be there when they can make use of it—and they're developing, too, a habit of wanting to know, of finding out for themselves. Instead

of learning geography, history, science and so on, all in watertight compartments, they've been finding out how everything fits together . . . and learning a lot of other things, too . . . things that will influence their whole life, and more. . . .[11]

Suggested Activities

1. List as many community study situations as possible which relate to your subject field. List both those which involve bringing representatives of the community to your classroom and those in which you take your pupils out into the community. Since, as you do this, you will need to know more about your community, consider the following suggestions:
   a. Consult the Chamber of Commerce.
   b. Ask experienced teachers for help.
   c. Study the local business directory.
   d. Talk with lifetime residents of the community.
   e. Interview the county agent and the editor of the local weekly or daily newspaper.
2. Visit some of the community resources which, after careful thought, seem to offer the greatest chance of enriching your subject area through the experience to be gained from seeing them. Take notes while you are there; gather data as is suggested on pages 256–257.
3. Make a list of the people you met during your survey who are willing to come to your classroom to talk to and be questioned by your students.
4. Plan a visit, tour, or field trip into the community. As you plan, keep a record. Devise your own record, or use the headings on page 257.
5. Arrange to preview such films as the following:
   a. *Community Resources in Teaching*, Sound, B&W, 17 min., Iowa University.
   b. *Field Trip*, Sound, Color, 11 min., Virginia State Dept. of Public Instruction.
   c. *Near Home*, Sound, B&W, 27 min., British Information Services.
   d. *Our Town Is Our Classroom*, Sound, B&W, 18 min., United World Films.
   e. *The World in a Schoolroom*, Sound, B&W, 20 min., United World Films.

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[11] *Local Studies*, Ministry of Education Pamphlet No. 10, Prepared by the Central Office of Information, His Majesty's Stationery Office, London, 1948, pp. 81–82.

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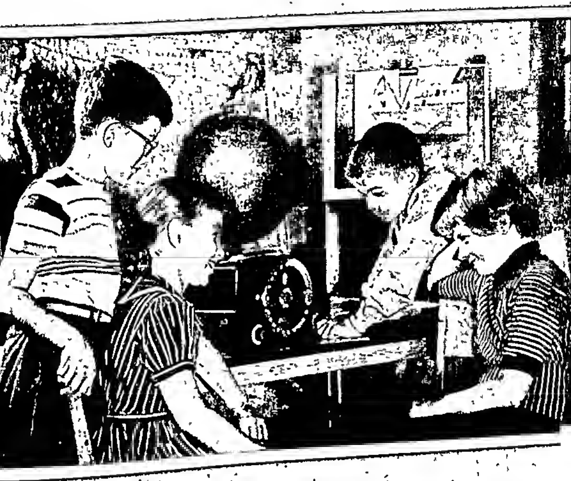

Audio Learning Experiences

TODAY THE PRESIDENT DELIVERED HIS MESSAGE TO CONGRESS—AND TO us. Though we were in a classroom a thousand miles from Washington, his words were as clear and impressive and meaningful to us as though we were in the same room with him."

And this was true because through radio, important current events are usually carried into every corner of the land. No one, no school need be out of reach of radio, and few indeed are without one of the nearly 100,000,000 sets in working condition in the United States.[1] . . .

In another classroom on another day:

"This morning we listened to Alexander Graham Bell. I was near enough to hear the first words ever to travel over telephone wires. It was thrilling to 'be there' though it actually happened in 1876."

And all the students were "there"; they heard the sound of voices, and then Mr. Bell's metallic-sounding voice: "Mr. Watson, please come here, I want you." This was possible because countless important historic events have been expertly reconstructed in dramatizations by accomplished writers, actors, and producers, and then recorded by mechanical and electrical means for use in classrooms everywhere.

It is not surprising that since World War II thousands of new audio learning devices—radios, record turntables, tape playbacks—have found their way into our classrooms. They are electronic devices. But they are more than that. They are the means of bringing real-life utterances and dramatizations of important events into any classroom, and they are available to any teacher who believes that audio learning opportunities are essential to the progress of his class.

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[1] Radio Corporation of America, *Market Research Report*, 1955.

THE SCOPE OF AUDIO EXPERIENCES

Probably the greatest value of audio experiences is to be found in their enrichment possibilities. If listening situations are carefully planned, audio experiences can, through the combined effect of voice, environmental sound, and music, capture the pupil's attention and whet his imagination. They can motivate interest and enrich learning situations by supplementing other teaching materials such as pictures, books, charts, displays, objects, etc.

Audio experiences can re-create the past with great emotional impact by dramatizations, in some cases with music. The voices of speakers, poets, and teachers, and the performances of musicians, can be brought into even the most remote classroom.

Through radio and recording, master teaching in such diverse fields as science, social studies, art, music, language arts, safety education, etc., can provide enrichment experiences both to the pupil, in the form of additional useful information or techniques, and to the teacher, as models to be followed. New ideas about classroom procedures often supplement information *per se* when a carefully planned and produced radio or recorded "lesson" is used at the appropriate time in the local classroom.

Audio experiences are available through three major sources: the radio program, which usually is broadcast to the service area of the educational station, the educationally useful commercial program, and the recording. Recordings are in a transitional stage; as used here, the term includes records of radio broadcasts as well as the disk records and tape recordings made especially for distribution and use in classrooms (often, too, for radio broadcasts). Educationally useful commercial programs include such presentations as news and special events broadcasts (opening of Congress, political conventions, inaugurations, etc.); since they are familiar to everyone they will not be discussed further. The remainder of the chapter is given over to a discussion of the other two types of classroom audio experience.

EDUCATIONAL RADIO

Classroom use of radio is a young but healthy phase of American education. Systematic use of radio in the classroom had its beginning in 1919. In that year, WHA, the state-owned University of Wisconsin station, completed sufficient experimental work to begin scheduled informa-

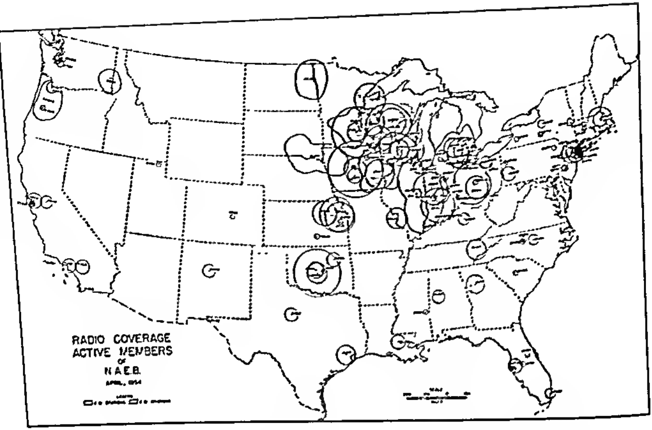

Fig. 10.1. Areas of the United States served by educational broadcasting stations.

tional broadcasts to schools and communities in that state. On the heels of this remarkable development in broadcasting over WHA and shortly afterward over its sister station WLBL, other regularly scheduled broadcasts were begun over KDKA, Pittsburgh (the origin of the Pittsburgh School of the Air); WWJ, Detroit; and KUOM, the University of Minnesota station. Between 1919 and 1922, radio broadcasting came into being as a schoolroom source of socially useful information in science, social studies, art, music, home economics, language arts, etc.

Today, vast areas of the United States can tune in on state and regional networks. Typical of the development of FM are New York state's Empire School Broadcast Service, the Indiana State School of the Air, the Wisconsin School of the Air, the Minnesota School Broadcast Service, and the Texas School of the Air. City facilities include carefully worked-out, curriculum-coördinated radio programs in such places as Cleveland and Cincinnati, Los Angeles, St. Louis, New York City, Detroit, Chicago. Indianapolis, Omaha, Flint (Michigan), and a host of others.

Radio provides source material for the main stream of classroom work.

In the words of George Watson, State Superintendent of Schools, Wisconsin State Department of Public Instruction: "Radio is not an addition to education. Radio is not something to be placed on top of education. Rather, radio *is* education."

Learning by listening to the radio is a naturally interesting activity. Records of the Wisconsin School of the Air show that carefully planned learning experiences in conservation, art, music, creative dramatics, and citizenship reach listeners in almost 4000 community and rural schools. More than 256,000 elementary-school children participate in the Wisconsin School of the Air. Actual enrollment figures in 1956 are distributed as follows in the regularly scheduled radio programs:[2]

Wisconsin School of the Air, 1955–1956	
Let's Find Out	87,080
People and Places	50,000
Let's Draw	90,960
Let's Write	60,740
Let's Sing	65,000
Music Time	63,420
Rhythm and Games	66,320
Book Trails	76,720
What's New Outdoors?	29,840
(2nd semester)	
News of the Week	40,000
Revoici Mimi	6,250
Visitons Mimi	4,000
Total registrations	640,330
Approximate number of children	256,120

Radio in these school situations does not do the teachers' work; it supplements their planning activities and the materials locally available and enables pupils to explore things, ideas, and places more fully. That radio is an enriching audio experience is well brought out by William Levenson, who calls it a new and vivid approach to education.[3]

[2] Annual Report of the Wisconsin School of the Air, Station WHA, University of Wisconsin, 1955–1956.

[3] William B. Levenson and Edward Stasheff, *Teaching Through Radio and Television*, Rinehart, New York, rev. ed., 1954, p. 26

CHARACTERISTICS OF GOOD SCHOOL BROADCASTS

The modern school broadcast is a carefully planned audio learning experience which utilizes resources beyond those available in the usual classroom. Because these broadcasts are usually prepared under the supervision of excellent teachers, school radio programs make possible outstanding and unusual learning experiences.

The radio writer, realizing that sound alone is the means through which radio-borne ideas are carried into the classroom, consults both teachers and subject experts regarding information which will lend itself to this means of communication. As a result of this mutual planning, existing programs reveal several characteristics that may be rather consistently identified with educational radio.

1. *The expert teacher and subject authority participate to bring an appropriate and enriching experience into the classrooms in the reception area.*

The *People and Places* program of the Wisconsin School of the Air, for example, provides such an audio experience each week to Grades 5 through 8. Each of the programs fuses the information provided by an internationally known anthropologist with classroom teaching as planned by expert consultant teachers. The actual programs are written by experienced radio script writers.

Each program reports on human living patterns and their development in various areas of the world. These experiences thus provide readiness backgrounds to reinforce local classroom studies in history, geography, and the social studies. A manual of suggested study activities, lists of supplementary reading, and 16 mm. sound motion-picture films were supplied to the teachers of 50,000 Wisconsin school children in 1956.[4]

The St. Louis radio science series for Grades 4 to 6 is another example. Programs were planned coöperatively by science teachers, experts in the field, and specialists in radio program techniques. Many conferences were held during which the curriculum objectives for the three grades were discussed. On the basis of these discussions it was decided that certain of the objectives could be achieved by means of an educational radio program. Among these objectives were the following:

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[4] *People and Places*, Wisconsin School of the Air, University of Wisconsin, Madison, 1956.

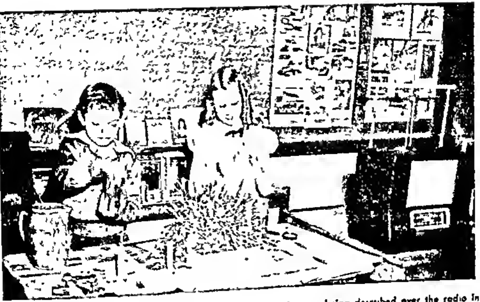

Fig 10 2 Children in the classroom do the experiments that are being described over the radio in this science broadcast on soil and water A successful lesson by radio encourages pupil participation.

1. Each program would encourage study by the class before the radio broadcast itself.
2. Each program would include carefully planned experiments which would be performed simultaneously in the broadcasting studio and in the classroom by two or three students who would act for the class during the broadcast (Fig. 10.2).
3. The class would draw its own scientific conclusions during a utilization and discussion period *following* the broadcast (Fig. 10.3).
4. Programs would encourage children to become familiar with commonly used laboratory equipment and techniques.
5. Programs would develop in the children open-mindedness and "see for yourself" attitudes that are exceedingly useful in living.

Finally a radio lesson handbook was prepared and distributed to every teacher. The handbook described each program, listed the materials that should be on hand when the broadcast began, listed reference or classroom reading materials, and described what the student experimenters would do during the broadcast.

Because the broadcast itself was only one part of the entire classroom learning situation, other audio-visual aids which could be used were described by title and content and purpose. They included specimens,

Fig. 10.3. After the broadcast the children question and discuss, and repeat the experiments if necessary. Pupil participation serves as an evaluation of the learning experience.

sound films, filmstrips, and books from the library that were to be in the classroom at the time of the broadcast. Directions for display board exhibits and chalkboard diagrams were also given. The broadcasts were transcribed so that they could be used in classrooms at other times than those called for by the regular broadcast schedule.[5]

[5] Adapted from Catherine Dillon, "The Museum with a Voice," *Childhood Education*, March, 1950, pp. 316 ff.

2. *Educational radio broadcasts provide an immediate awareness of and an opportunity for "listening participation" in current history.*

The current events benefits of classroom radio are derived in two ways. The special events program can take the class to the floor of the Senate, or to the platform as the President of the United States is given the oath of office, or to an important session of the United Nations—all when these actual events are taking place.

The other way in which benefits are derived from current events broadcasts can best be described in terms of current programs, such as *News of the Week* (Wisconsin School of the Air) and *Current News* (St. Louis Public Schools). The real worth of the regular weekly or daily news broadcast for school children is the background information usually supplied by some well-qualified person who explains, in terms children can understand, the events leading up to the specific occurrence, and interprets its significance, its possible relationship to history, etc.

3. *The school broadcast is an effective means of presenting music and teaching appreciation of music.*

A medium that depends on audio communication lends itself naturally to the presentation of well-rehearsed, skillfully presented music of all types—classical, folk, and contemporary. Educational radio broadcasters can usually arrange for skilled performers to participate in programs planned around a definite theme, such as the music of other times, other lands, etc. One series of broadcasts, *Masterworks from France*, presents and explains French music; *Music Time* and *Rhythms and Games* emphasize folk music and other songs. *Let's Sing*, a Wisconsin program in which 65,000 children from all over the state participate, ends each season with a "sing" in Madison to which children come by the busload from all over Wisconsin for an afternoon of fun. Their appreciation of an educational experience, which during a semester-long series of broadcasts has enhanced their keen understanding and appreciation of good music, is evident (Fig. 10.4).

4. *Educational radio programs make it possible for experts to visit any classroom.*

Because radio broadcasts can bring valuable experiences economically into the most remote classroom, the expert—heretofore known only through news accounts—is now a "visitor" and resource person for any classroom. The political leader, the civic planner, the historian, musician,

Fig. 10.4. What kinds of learning and attitudes are evident in this "radio sing"?

poet, or folk singer can provide enrichment experiences via classroom radio. At a cost of comparatively little time and effort, his half hour in the educational broadcasting station can be brought to a hundred thousand children in schoolrooms anywhere in the station's service area.

Radio programs created and distributed by educational broadcasting stations are an extremely practical way of increasing the effectiveness of capable people in all fields. At the same time the enrichment and readiness experiences they provide may open the door to better pupil achievement.

LIMITATIONS OF EDUCATIONAL RADIO

That educational radio programs have limitations must be recognized. AM broadcasts are often interfered with by static and abnormal weather

conditions. This has been largely corrected by FM broadcasting, which almost guarantees static-free and uniformly high-quality reception.

Nevertheless, several limitations still remain. In the first place, even today only a relatively small percentage of the school population is served by educational radio (Fig. 10.1).

Centrally broadcast educational radio programs are usually on a predetermined time schedule which coincides less and less with the real needs of the various local schools as the term progresses and as individual differences in accomplishment create wider and wider spreads between the various classes. This problem is further complicated by differences in curricula and courses of study which make it exceedingly difficult to plan programs that will serve the needs of all local schools.

The last two difficulties are being overcome to some extent by recording top-quality broadcasts for distribution via disk or tape recordings.

One of the most interesting recent developments is the establishment of several "tapes for teaching" services. Many of the major American universities and colleges—Minnesota, Michigan, Illinois, Utah, and Iowa, among others—are conducting a systematic review of existing educational radio program series; they have selected the most significant of these, and have transferred them to tape recordings.[6] Carefully annotated descriptions of these tape recordings are now available in catalogues issued by these universities. More recently the Department of Audio-Visual Instruction of the National Education Association has prepared a composite catalogue of such materials.[7]

Teachers can rent these tapes at a very low cost, usually $.50 per 15-minute program. Or they may send in blank tapes on which the materials they choose are recorded; these tapes are returned to the school for permanent possession. A slightly higher charge is usually made for this service. This trend leads directly to a consideration of the role of recorded audio experiences in classroom teaching.

RECORDED AUDIO EXPERIENCES

Like radio, both disk and tape recording is a means of bringing information to learners. Educational recordings present their information

[6] See Source Lists, p. 557.

[7] *National Tape Recording Catalog*, Department of Audio-Visual Instruction, National Education Association, Washington, D.C.

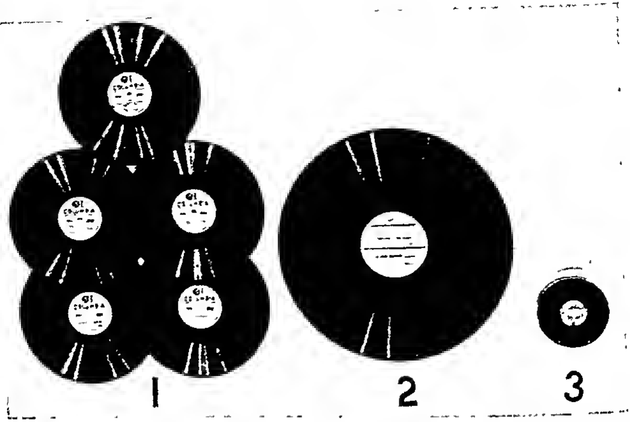

Fig. 10.5. Three forms of recording thirty minutes of material: (1) 78 r.p.m. recordings; (2) transcription; (3) tape recording.

through audio imagery. This information may be mechanically inscribed on traditional recordings, on electrical or instantaneous transcriptions, or on long, narrow ribbons of tape. In each case the practical purpose is to capture original sound and preserve it for later use.

Today the teacher who is investigating recorded information may find it in the form of ordinary phonograph records with which he has had long acquaintance. These records rotate 78 times per minute and can be played on an ordinary phonograph; their length varies from 3 to 6 minutes for one side, and their diameter from 6 to 12 inches.[3] Recordings can be stored easily in files such as are used for letters and flat pictures.

Transcriptions are similar to phonograph records except that they allow more economical use of the recording surface. Transcription disks rotate at slower speeds (33⅓ r.p.m.), are larger, and consequently "hold" longer programs. Transcriptions first came into wide use for radio rebroadcast

[3] Long-playing records at 45 r.p.m., etc., are only currently beginning to be identified with educational materials.

purposes. They vary in size from 14 to 18 inches. The 16-inch is the most commonly used size, carrying approximately 15 minutes of program material on each side. As a basis of comparisoo, a 16-inch double-face transcription provides approximately as much material as do three double-face 12-inch records of the older and more traditional type.

Still another type of recording that is heing increasingly used is made on a long tape that is coated with metallic oxide. This type of recording offers economy of cost, ease of handling, permanence, and freedom from wear, dust, and other deteriorating factors which affect records and transcriptions. Tape recorders play back at varying speeds, usually 3¾ or 7½ inches per second. The reels for the tapes are usnally 5 or 7 inches in diameter.

Tape recordings may be made originally in the school or from radio programs or from "on the spot" current events situations. They vary in playing time from 30 mioutes to two hours, depending on the make of the machine, the size of the spool, and the speed with which the tape is run through the machine.

In using records, transcriptions, and tape recordings, the teacher is primarily concerned with the information they cootain and with the opportunities thus offered for realizing educational goals.

CHARACTERISTICS OF EDUCATIONAL RECORDINGS

Almost all the advantages ascribed above to the use of radio in the classroom apply equally to recordings. That this is true is seen in the fact that today increasing numhers of outstanding school broadcasts are available on records, transcriptions, or tape recordings.

Because of the nature of history, the recording which reconstructs history through dramatizatioos makes a primary contribution in this field. The *Enrichment Record* series in American history is a case in point.[9] It includes recordings with such titles as *Voyages of Columbus, Landing of the Pilgrims, California Cold Rush, Riding the Pony Express, The Louisiona Purchose, George Washington Carver, Building the First Continental Railroad,* and the *Wright Brothers.* The quality of these dramatizations demonstrates that recordings as well as educational radio broadcasts call for the coöperative skill of historian, script writer, and the teacher who is well versed in classroom methods.

[9] Enrichment Records, 246 Fifth Avenue, New York 1, N.Y.

Fig. 10.6. The current trend is toward recording outstanding school broadcasts on tape. What classroom values does this practice hold?

Apart from these close parallels between radio broadcasts and recorded audio learning experiences, there are several characteristics of educational recordings which make them a unique audio experience, and therefore particularly valuable as a teaching material.

1. *Educational recordings can bring the actual words of contemporary political and socially important persons to the classroom.*

Since the middle 1920's, important news broadcasts have been recorded or taped by the major networks. Excerpts of these recordings are now available for school use under such titles as the *I Can Hear It Now* series.[10]

Imagine how students feel when, studying the causes and events leading to the outbreak of World War II, they hear the actual voices of famous personalities of that time. On educational recordings the events leading to the war, of the war itself, and following it are now available for "listening" in history classes everywhere. In one of the *I Can Hear It Now* series, the voices of Churchill, Eisenhower, and Willkie are heard uttering the statements and prophecies which time has proved have al-

[10] *I Can Hear It Now*, Columbia Master Works, Edward R. Murrow and Fred W. Friendly, 1933 to the present.

tered the course of history. On such recordings President Roosevelt can speak to today's students and to those of tomorrow:

> Yesterday, December 7, 1941, a date which will live in infamy, the United States of America was suddenly and deliberately attacked by naval and air forces of the empire of Japan. The attack yesterday on the Hawaiian Islands has caused severe damage to American naval and military forces. I regret to tell you that very many American lives have been lost. With confidence in our armed forces, with the unending determination of all our people, we will gain the inevitable triumph, so help us God.[11]

Truly such materials of instruction will take on added importance as each year passes. Imagine the reactions of students in A.D. 2000 when, in studying history, they hear the actual voices of the leaders of nearly a century before.

2. *Barriers of distance and expense can be overcome by the use of educational recordings.*

The teacher of a junior-high-school English class overheard a pupil say, "I wish we could get the person who wrote this book to visit us and explain himself to us. I'd have a lot of questions to ask him."

Many of us have questions when we try to interpret an author's words. Such an experience as was desired by this junior-high-school student is today made possible in the *Columbia Master Works of Literature* series.[12] Through the audio experiences provided by this series of recordings, students can listen as an author not only reads some selections from his works but in a pleasant and informal style describes his motivations in writing.

Similar recordings of audio experiences have been made by the National Council of Teachers of English.[13] Through these recordings teachers can arrange for their pupils to hear such poets as Robert Frost and Vachel Lindsay read their own poems. In another series, Basil Rathbone reads a collection of twenty-one poems. Such "listening" experiences provide further appreciation of poetry, but more important, they give students models of enunciation and reading which can serve as goals.

3. *The teacher has complete control of the planning and use of educational recordings.*

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[11] *Ibid.*

[12] *Columbia Master Works of Literature*, available through local distributors of Columbia recordings.

[13] National Council of Teachers of English, 211 W. 68th St., Chicago, Ill.

The recorded audio experience is a flexible instrument of instruction. The teacher can decide when a recorded audio experience should be used, and he should then plan carefully to create the best possible circumstances for its use. Educational recordings are not subject to time control as are radio broadcasts. Thus the teacher can choose the time for "listening" that will insure the greatest value for the experience.

Fig. 10.7. What kinds of flexibility in use are implied as these children prepare their audio learning experiences?

The last five years have witnessed an incredibly rapid increase in the number of recordings and transcriptions produced for teaching purposes. In addition the teacher can create his own library of tape-recorded materials by using the service described on page 281.

The preparation of educational recordings is now demanding the attention of publishing houses and record producers formerly concerned solely with the production of entertainment recordings. As a result, there are now available to schools carefully written, professionally produced recordings that can be "previewed" by the school before purchasing. The producers and distributors of these commercially prepared recordings are more and more realizing that, in order for the audio experience to be of the greatest value, the teacher must be able to select and, more important, completely control when and under what conditions recordings will be used.[14]

SELECTING AND USING AUDIO LEARNING EXPERIENCES

Some important procedures in selecting audio experiences are as follows:

1. The teacher should, whenever possible, audition the material before using it. Although this is difficult in the case of radio, radio broadcasts are usually announced well in advance and are described in study

[14] See Source Lists, pp. 534–557.

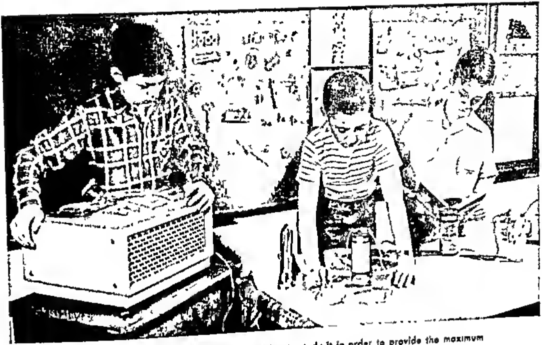

Fig. 10 8 Taping a broadcast usually enables a teacher to study it in order to provide the maximum possibilities for pupil participation.

manuals or summaries either sent to teachers or available on request from the broadcasting station.

2. In general, audio experiences should be judged on the basis of educational quality.

a. Is the audio learning experience presented in an interesting, well-organized manner?
b. Is the content authentic?
c. Is it appropriate to the age level of the group that will listen to it?
d. Will it make a real contribution that will be useful and effective in realizing learning goals?

3. When possible, the teacher should select materials for which suggestions for use are supplied. In the case of the recording, such suggestions are usually in printed form. In the case of the radio broadcast, study helps are often part of the broadcast itself; however, these too may be in printed form. In some cases scripts may be secured in advance so that the teacher can plan more effectively.

4. Are related audio-visual materials available or suggested for use?

The teacher should have available in the classroom, during or after the broadcast or recording, all materials—films, slides, objects, specimens, maps, etc.—which will help children more completely understand concepts developed during the audio experience.

In addition, these more general suggestions regarding selection apply. The teacher should select audio experiences which offer a promise of meeting the needs of the class. After he has investigated the program or recording, he should select only those that provide valuable and needed experiences. A teacher should never feel obliged to use a broadcast just because it is scheduled, or a record or tape just because it is handy.

Once a program has been selected, the teacher should assume definite responsibility for its carefully planned use in the classroom. While this is not always possible in the case of current events or news broadcasts, the day-by-day use of radio or recordings imposes definite utilization responsibilities on the teacher, which in turn yield results in terms of increased interest and efficiency of learning.

In general, five factors in connection with the use of audio experiences in the classroom should be considered by the teacher:

1. Motivation.
2. Removal of barriers.
3. Effective listening.
4. Creation of an effective listening environment.
5. Follow-up activities.

MOTIVATION

The presence or absence of interest in learning is the greatest factor in success or failure in classroom achievement. One of the teacher's key responsibilities is to arouse interest and enthusiasm in the young learners under his direction. Knowing in advance the general nature of a broadcast or recording allows him to establish readiness for listening to it. The teacher can encourage the children:

1. To discuss ideas and information they already have about the subject of the recording or broadcast.

2. To reveal their curiosity about the subject by discussing and listing things they are interested in knowing about or things which puzzle them.

3. To report travel or reading experiences or information related to the forthcoming program, record, or tape which will create further interest in hearing it.

When a study period—for example, in arithmetic—is ended suddenly and a radio program about geography is quickly turned on, without any warning, many of the educational outcomes normally to be expected become impossible. The same is true of beginning a recording too quickly.

A fundamental improvement in classroom procedure can be made by including activities which gain the pupils' active interest in the work they are doing. In the absence of true pupil interest, little or no true learning can take place. Therefore, any motivational or interest-inciting activity which the teacher can plan in advance of the listening activity will increase learning outcomes. Such activities must have a direct bearing on the subject of the broadcast or recording.

REMOVAL OF BARRIERS

In order to make the listening situation effective, the teacher must exercise care in anticipating possible barriers to complete understanding of the content of the audio experience. In some educational recordings suggestions about pre-listening experiences are part of the recording itself. For example, in the *School Guild Theater* series suggestions about removing barriers to listening are given on one side of each double-faced record. The dramatization of the story of Colonel George Goethals and the building of the Panama Canal has the following suggestions for the teacher:

> The class should be prepared for listening if students are to receive full value from the recording. They should know why they are listening and what they are listening for. Suggestions given here and in the next section, pre-listening activities, will help prepare students for the transcribed lesson. You may want to use part or all of the suggestions depending upon how much background your students already have. And remember, if you miss any part of the audioguide, you may repeat it by simply returning the needle. Now here are some of the names of people and places that will be mentioned in the dramatization. We will give them slowly so that you may write them down:
>
> Colonel George W. Goethals. Spelled G-o-e-t-h-a-l-s. Webster's pronunciation is gō'thălz. Colonel George W. Goethals, "W" for Washington.
>
> President Theodore Roosevelt (repeated).

Ferdinand de Lesseps (repeated). The French engineer who built the Suez Canal and later started the Panama Canal.

Some of the places which will be mentioned are:

The Isthmus of Panama.
Culebra Cut, now called Gaillard Cut.
Gatun, the name of a town, a lake and one set of locks.

You may want to put these words on the blackboard so that the class can see them as well as hear them. As background for the listening, students might review briefly the geography of Panama and events that led up to America's decision to build the Canal. Some of this informatinn is given in the first part of this drama so you will not need to spend much time in review. Pictures or slides about the Canal or Panama will add interest to the subject.[15]

In one study manual for a radio series on geography, the teacher is asked to have wall maps ready for use. It also suggests that a list of key vocabulary items be written on the chalkhoard for discussion before the broadcast. In this way, the broadcaster and teachers in many widely separated classrooms can work together during the actual broadcast. This point is brought out in the following excerpt:[16]

NARR. Now, let's turn to another map, a *physical* map of the continent. This kind of map is colored to show the different heights of the land . . . *from* the flat prairies to the high mountains. Unroll the physical map of North America, please.

MUSIC: UNROLL OF MAP

NARR. Unroll those maps, everyone. And let's have a look at the ups and downs of North America.

The program continues with specific instructions to find the Laurentian Shield on the map:

NARR. From the air, the Shield looks like a flatland broken by many rounded hills and thousands of lakes and swamps.

TRAPPER. That's where I go trapping, all right. I can tell you, you might as well say it's water with land in between.

NARR. Yes, most of the Laurentian Shield *is* the land of the canoe. *Remember*, though, it's so big that it takes in almost any kind of weather. In the southern part, the weather is much like ours in Wisconsin . . . and if you go farther north, there's cold weather and snow a good share of the year.

[15] School Guild Theater Series, *Dividing a Continent*, 33⅓ r.p.m., Training Aids, Inc., 7414 Beverly Blvd., Los Angeles, Calif.

[16] *North American Neighbors*, Wisconsin School of the Air, No. 1, September 19, 1949.

Fig 10.9. What are "Freeways"? What are we interested in knowing about them?

In winter people travel by dog sled. And far up north, at the top of North America, it's cold so much of the year the ground never thaws out and no trees can grow. This is the tundra or *treeless plain* where you find the reindeer grazing, and Eskimos about the only people. Most of the Laurentian Shield, large as it is, isn't a very comfortable land to live in.

Two pre-listening responsibilities are evident here. (1) The pupils should be well acquainted with the physical map and its shaded areas, printed symbols, and place names. (2) Since the general subject of the broadcast is the geography of North America, key terms—"shield," "Laurentian Shield," "tundra," etc.—should be studied beforehand.

But specific advance information about broadcasts is sometimes not available. If this is the case, the teacher will do well to watch the listeners' reactions. Unknown words, complex ideas that are explained too quickly or not sufficiently are often "recorded" as frowns, squints, and

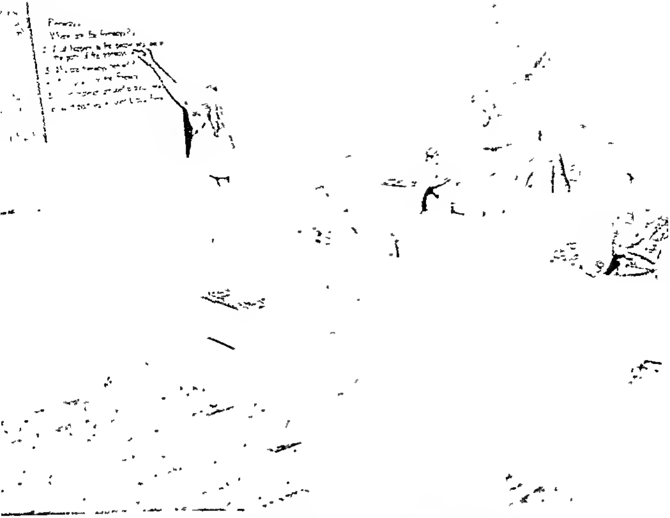

Fig. 10.10. The children list their own listening purposes.

scowls, or just plain inattention. These are cues which point up the need for later clarifying discussion.

The child who knows what to expect, who has had some preliminary study on the content of the program, whose interest has been alerted will listen with increased benefit.

EFFECTIVE LISTENING

In classroom study situations, "giving an assignment" is a time-tested practice. In reading a chapter in a textbook, the pupil who has a clear, workmanlike idea of what he wants to accomplish is more likely to realize his goal than the child who proceeds without a purpose. This is the case with the radio listener as well. The listener with a purpose will have a plan in mind. His search for information will be selective. He will be better able to recognize important points and discard less valuable ideas.

Suggestions for listening may take varied forms. The teacher and the class may discuss and list purposes. The children should be encouraged to create their own listening purposes (Fig. 10.10). Pupils who do this are usually highly motivated while listening.

As the children volunteer important questions they want answered, other pupils list these on the chalkboard. Such items as names of important people, facts, dates, places, uses, etc., become clues for listening. Whenever possible, the listeners themselves should plan their own activities.

CREATION OF AN EFFECTIVE LISTENING ENVIRONMENT

The schoolroom can be a very satisfactory place in which to listen to radio and recordings. This, of course, necessitates enough receivers, turntables, and tape playbacks so that each room will have ready access to the required equipment at exactly the time it is needed. The use of the auditorium or a listening area other than the classroom is not usually desirable. Teachers and pupils who have grown accustomed to the classroom as the place in which their day-to-day work is being done should do their listening there also.

Ordinarily the area directly in front of the speaker is most effective for hearing. This is true because sound waves that come directly from the loud-speaker are less distorted than if they first strike reflecting surfaces. An extension cord should be used in classrooms where the only outlet is in the back of the room, so that the children will not have to turn uncomfortably to face the speaker.

By moving the speaker to the front of the room and away from sound-reflecting surfaces (Fig. 10.11), good listening conditions can be provided without upsetting the entire classroom. In some cases, having the children arrange their seats in a shallow arc before the speaker makes for better listening.

The attitude of both children and teacher during the audio experience should encourage complete attention. Casual conversations should be eliminated. Complete attention should be fixed on listening. By his own attitude the teacher can help create an attentive listening attitude in the pupils. Interruptions should be discouraged. Some teachers put cardboard signs on the door: "Please—we are listening."

One of the most important functions of the teacher during a radio

Fig. 10.11. The radio is placed so that all can hear easily and give it their undivided attention.

broadcast is to terminate a program that does not fit. Occasionally, in spite of the most careful preliminary study and selection, an inappropriate program will come through. If that happens, turn it off.

FOLLOW-UP ACTIVITIES

The school radio broadcast, recording, or tape recording should be a learning experience—one of many such experiences. As such, it must be absorbed into the learning and project activities that are going on in the classroom. An audio experience cannot provide maximum value if it is listened to and then left, regarded as a transitory experience.

Follow-up opportunities which spring from listening are as numerous as the ideas of ingenious pupils and teachers. The extent to which an audio program stimulates follow-up activities is one good way of judging the effectiveness of the program as such. Search for additional information, art activities, work in language skills, creation of student-participation broadcasts, and reading research are only a few of the many possible follow-up activities.

One outgrowth of the "Afield with Ranger Mac" programs of the Wisconsin School of the Air took on more than school-wide significance, for it reached right out into the community (Fig. 10.12). There in coöperation with the forward-looking work done by the 4-H Clubs of the state:

> Wisconsin school children, many of them inspired by Ranger Mac, have planted more than 7,000,000 trees in 214 school forest plots. One school publishes a monthly nature magazine called "The Trailhitter." Others have es-

Fig 10.12. This community project was radio-inspired

tablished school museums, made vivariums, and in a variety of ways carried on the explorations of nature begun for them on the radio while "Afield with Ranger Mac." More important than these activities, Ranger Mac believes, is "the training in the worth of their natural heritage that the children carry over into adulthood."[17]

In a Georgia state committee project, an almost entirely new method of reading poetry, with important potentialities of a follow-up nature, was established by means of a series of recordings on choral reading:

The pupils of the fifth grade in Horace Mann School and their teacher, Miss Mae O'Brien, have worked out a way of reading poetry so that all of them can enjoy it together. It doesn't take a long time either. They are going to read together now. Before the next few minutes are over, each one will have shared in the reading of a poem. No, it isn't magic. The first verse they are going to read is an old, old one, probably as old as "Jack and Jill," maybe older, because we don't know how old "Jack and Jill" really is. The verse is

[17] Richard S. Milbauer, "Wisconsin School of the Air," *Amerika*, U.S. Department of State, June, 1949.

Fig 10.13. "This is the way I'd tell a story over the radio." Note how many of the children identify themselves with the situation.

called "John Cook Had a Little Grey Mare." The first line will be read by the teacher and the whole group will answer. The answer is called a refrain because the pupils keep saying the same words over and over again.

Miss O'Brien. John Cook had a little grey mare
Whole Group. Hee haw hum
Miss O'Brien. Her back stood up and her bones were bare
Whole Group. Hee haw hum
Miss O'Brien. John Cook was riding up Shooter's bank
Whole Group. Hee haw hum
Miss O'Brien. And there his nag did kick and prank
Whole Group. Hee haw hum
Miss O'Brien. John Cook was riding up Shooter's hill
Whole Group. Hee haw hum
Miss O'Brien. And his mare fell down and made her will
Whole Group. Hee haw hum

MISS O'BRIEN. The saddle and bridle she laid on the shelf
WHOLE GROUP. Hee haw hum
MISS O'BRIEN. If you want any more you can sing it yourself
WHOLE GROUP. Hee haw hum.[18]

An audio experience such as this not only serves to bring a new pattern to teacher and pupil but creates a pattern which the teacher can alter as he devises further and different experiences in choral reading. The child finds pleasure and confidence in participating in this kind of audio experience. He likes the idea of imitating the words and inflections he hears. Following this activity, the teachers encouraged the children to read and select poems which they then arranged in parts for choral speaking. As this proceeded, the teachers slowly withdrew from reading, until finally all the lines were being read by groups of pupils, with solo parts read by individual children.

Still other types of follow-up activities growing out of school broadcasts have been described by Dorothy L. Gilmore, teacher at the Grant Elementary School in Tacoma, Washington. They include class-inspired speaking activities stressing tone quality, enunciation, diction, and poise which the students observe in the radio actors themselves during the broadcast. This is an opportunity for any speech or language arts teacher to find good models of diction and enunciation.

More and more effective audio learning experiences are being arranged for classroom use today. It is the task of the teacher to be aware of these opportunities, to select wisely those which will specifically enrich the classroom learning environment, and then to plan for their best use.

SELECTING AUDIO EQUIPMENT

The appearance of new learning materials—in this case, radio broadcasts, records, transcriptions, and tape recordings—brings with it the responsibility of providing that equipment for listening be available to teachers at the time they need it. In the paragraphs that follow, both AM and FM radio receivers, as well as turntables for records and transcriptions, will be discussed. The detailed discussion of tape playback equipment, however, is left for the following chapter.

[18] Effie G. Bathurst, *Phonograph Records as an Aid to Learning in Rural Elementary Schools*, University of the State of New York, State Education Department, Albany, 1943, pp. 127–128.

Until recently amplitude modulation (AM) radio receivers were almost universally used. Today, however, increasing numbers of frequency modulation (FM) receivers are being used, and many school broadcasters have added FM or shifted from AM to FM.

Frequency modulation, or FM, has become a useful tool in education, on both the broadcasting and receiving ends. The Federal Communications Commission has reserved 20 FM channels for non-commercial educational use, thereby making it possible for schools to put their own stations on the air. There are approximately 130 such educational stations on the air.

As the result of these stations and the more ready availability of broadcast time for educational programs, schools are turning to FM reception. In congested city areas having a high local interference level, FM gives a static-free signal. In rural schools which formerly got interference from lightning, atmospheric disturbances, "high lines," transformers, electric fences, and other types of man-made static, FM gives clear reception.[19]

A very important development in FM is the steadily decreasing price at which a high-fidelity receiver can be secured for classroom use. Such sets as that shown in Fig. 10.14 indicate the type of equipment currently available.

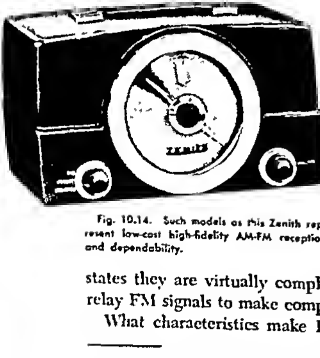

Fig. 10.14. Such models as this Zenith represent low-cost high-fidelity AM-FM reception and dependability.

Much discussion surrounds comparisons of AM and FM receiving sets for schoolroom use. One acknowledged weakness of FM—namely, the short range of the FM signal, usually 75 to 100 miles—is being overcome through network or relay stations. Several states—New York, Indiana, Wisconsin, and Minnesota—have planned state-wide networks (in three states they are virtually completed) which call for booster stations to relay FM signals to make complete state-wide coverage possible.

What characteristics make FM radio receivers desirable? As Engel

[19] From statement made in 1956 by Harold Engel, Division of Radio Education, University of Wisconsin.

said, FM reception is not affected by electrical interference or static induced by either natural causes or man-made electrical equipment. FM reception is not impaired by nearby high-tension power lines, large electrically driven machinery, electrical storms, or other static-producing phenomena. Briefly, this is due to the fact that a basic similarity exists between AM carrier signals and the "signals" emanating from power lines, electrical storms, electric motors, etc. Hence the average AM receiver detects and amplifies either or both of these types of signals, whereas FM receivers detect and amplify only FM signals.

An even greater reason for the increasing use of FM is the fact that broadcasting licenses give greater leeway to FM than to AM stations. Almost all the AM radio channels are assigned to powerful commercial stations. There are more "open" FM bands, however, which means more time "on the air" for educational use. No longer is it necessary for educational programs to curtail the time of broadcast because of competition from commercial sources. The more efficient FM receiving sets and the decrease in their price are two hopeful signs for schools that are contemplating equipping each classroom with high-fidelity radios.

Selecting a radio should be a coöperative project for the radio expert and the classroom teacher. It is their responsibility to see that the programs come into the classroom and that they can be heard with sufficient volume and without annoying interference. Classroom radios should be inexpensive, of sturdy construction, and easy to operate.[20]

The following criteria for selecting suitable classroom radios are suggested: (1) Until either AM or FM school broadcast facilities become universal, a combination AM-FM receiver should be chosen. (2) A low-cost set should be considered only if it offers high-fidelity tone reproduction, simplicity of operation, good volume, self-contained antenna, light weight, and operational safety. Fortunately several AM-FM radio receivers are now available which combine high-quality performance and low cost.

SELECTING RECORDING PLAYBACK EQUIPMENT

Perhaps one problem still confronting the teacher is to persuade the proper officials to buy the kind of machine and materials that will make it possible to provide worth-while audio experiences in his classroom.

[20] See Source Lists, p. 556.

Fortunately many good playback machines are on the market today.

Even casual acquaintance with recording equipment shows that a two-speed turntable, 78 and 33⅓ r.p.m., is desirable. Listening to records or transcriptions as they are being played provides an opportunity to detect noises in the mechanism proper, or surface sounds which interfere with audibility. A good turntable operates without sounds or noises which will compete with the material being played.

Fig. 10.15. Today's trend is toward small, light-weight, high-fidelity playbacks, both record and transcription. This Audio-Master three-speed turntable is an example.

Consideration should be given to the reputation and service facilities of the dealer from whom the playback equipment is purchased. Reputable dealers are only too anxious to demonstrate what well-constructed, high-quality record players can do. Aside from this, the price of the equipment may be the determining factor. Most important of all, however, is the dealer's reputation for giving prompt service and guaranteeing the quality of the equipment he is selling to the school. A typical playback is shown in Fig. 10.15.

EVALUATING AUDIO LEARNING EXPERIENCES

The use of audio experiences in teaching is justified only when greater reality, interest, vividness, authenticity, and learning result because of them. In each area of school work, audio materials must be evaluated in terms of such outcomes. Hence it is desirable that, following a broadcast or recorded learning experience, the teacher and pupil evaluate what has happened.

For the Teacher

1. Did the audio material provide learning experiences which could not have been provided more easily with traditional materials?
2. Am I acquainted with all the sources of audio materials in my subject area?

3. Did I carefully preaudit the material I used?
4. Did I give attention to such factors as acoustics, seating arrangement, location of the speaker, and volume, while the class was listening?
5. Did I adequately prepare students for this listening activity by:
   a. Outlining vocabulary problems?
   b. Helping them know about what they were expected to accomplish?
   c. Encouraging discussion in which they could show their interest?
6. Did I encourage follow-up activities such as discussion and self-evaluation through testing?
7. Did I encourage follow-up projects such as reading, simple research, creative art expression, creative dramatic expression, etc.?

For the Pupil

1. Could I hear well enough to understand the material?
2. Did I know what I was to do before I began to listen?
3. Did I contribute any ideas during the discussion?
4. Did I help plan follow-up activities?

SUMMARY

Audio learning experiences are a means of enriching classroom learning opportunities. Included in these experiences are educational radio broadcasts, tape-recorded broadcasts, records, transcriptions, and tape recordings.

Regardless of the type of audio experience used, good listening carries with it certain responsibilities for the teacher. He should select audio material on the basis of its real contribution to learning. He must prepare learners for effective listening by helping them to create interest in the material. He should recognize and remove any barriers to successful listening. He should provide the best possible physical conditions for listening (seating arrangement, equipment, etc.) and he should arrange for evaluation and follow-up activities.

As awareness about audio learning materials increases, as assurance is gained in using these materials effectively, the capability of these materials to enrich classroom learning environments will be realized.

Suggested Activities

1. Select a suitable record or transcription and use it in one of your classes. Describe (a) utilization technique employed, (b) student reactions, (c) your own reactions to the effectiveness of this teaching aid.

2. Discuss the relative educational advantages and disadvantages of the record or transcription accompanied by teaching and pupil guides (a) printed separately and (b) appearing on the disk itself.
3. Compare the way you would use records and transcriptions with the way you would use school radio broadcasts.
4. Arrange with a local audio-visual equipment dealer to examine the latest audio equipment. Report your findings to your group.
5. Interview persons engaged in educational radio work to discover:
   a. The nearest sources of educational broadcast programs.
   b. Where the effective use of radio in the classroom may be observed.
   c. Listings of current classroom broadcasts.
   d. Where equipment may be seen in use or on display.
6. Investigate the means of recording current radio programs for future use in the classroom.
7. Plan to use a radio program in a specific teaching situation. Consider such things as:
   a. The characteristics of radio which make it particularly useful as a learning experience.
   b. The teacher's responsibilities in using a radio program effectively in the classroom.
   c. The responsibilities of the pupils before, during, and after the broadcast.
   d. Arrangement of the listening enviroment.

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11.

The Tape Recorder

JUST BEFORE THE TEN-MINUTE WARNING BELL RANG, MR. STANTON MADE the final adjustments on the recorder. He then arranged the room so that the students would not see the recorder as they took their seats. The microphone was well placed, but hidden.

When the period began, the students, one by one, gave what they believed were thoughtfully prepared two-minute summaries of free reading they had done the preceding week end.

As the last student returned to his seat, Mr. Stanton asked, "How would you like to hear yourselves?"

The silence was taken for assent, the recorder was brought into view, and an instant later the unmistakable sounds of the "reporters' " voices came from the recorder. There was complete silence when the listening began. Soon, knowing glances passed from identifier to identified as the "played back" reports went on.

Moments later the recorder was shut off and the teacher asked, "Well, what do you think?"

Spontaneous reactions came from every quarter:

"Was that what I said?"

"It couldn't be!"

"Mary was good!"

"I wasn't either! I stumbled!"

"I don't believe it—why I sound terrible."

"Is that really the way I sound?"

Comments came so fast that they were jumbled.

Soon a more orderly discussion got under way. Those *were* their voices. The students weren't satisfied. Something had to be done; admissions of need for improvement were unanimous. What could be done? Several students asked if they could use the recorder after school for practice and

Fig 11.1. Once simple operating procedures are learned, the tape recorder is a most flexible learning supplement limited only by the imagination of teacher and pupils.

listening. Others wanted to try again. Then one of the girls said, "We should take lessons in enunciation." Another student suggested, "By listening to some of the recordings we had in history class, we could learn a lot about good speech habits."

During the next two weeks, everything suggested was tried—and more. The improvement in speech habits was noticeable.

In another situation, a class in instrumental music used a recorder for self-evaluation and criticism.

A clever dramatic coach, unable to make a point clear, used a recorder so that the class play's ingénue could listen to herself. She "heard" the point and set about correcting the inflections she had been using meaninglessly.

In still another situation, the "Radio 'Casters," a group of high-school

upperclassmen, used a recorder not only to rehearse and listen but to record the final productions, one of which was good enough to be broadcast over the local radio station.

CLASSROOM RECORDERS

Several kinds and combinations of audio recording devices are in use. Originally most recording had to be done on disk recorders which converted sound waves, picked up by a microphone, into grooves of various widths and depths; these grooves were inscribed onto the surface of a plastic-coated disk or blank record. This produced a single record not unlike those described in the preceding chapter.

Next, wire recorders made their appearance in the classroom. The wire recorder is a mechanical device that permits the instantaneous magnetic recording of sound on a long strand of fine wire which the machine automatically unwinds and winds on spools. Wire recorders are in relatively wide use; but because of rapid improvements in the ease and efficiency with which recording can now be done in the classroom, both the disk and the wire recorder have quite generally been replaced by the magnetic tape recorder. This machine, its selection, operation, and use in classroom instruction, is the subject of this chapter.

The tape recorder is similar to the wire recorder in that the audio image is recorded and later played back by magnetic means. In the tape re-

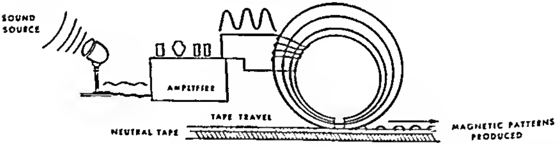

Fig. 11.2.

corder, the magnetic pattern of sounds is carried on a metallic-coated plastic or paper tape.

In making a tape recording, sound waves are picked up by a microphone and instantaneously converted into a series of varying electrical impulses. These impulses travel to a small magnet which touches a mov-

ing ribbon of metallic-coated tape. This coating receives and retains magnetic impressions of varying strength which correspond directly to the original impulses set up by the sound waves of voice or music (see Fig. 11.2).

The tape can be rewound and played back at once. The invisible magnetic impressions excite the magnetic head and create electrical impulses which, after being suitably amplified, activate the loud-speaker diaphragm to produce sound waves identical to those originally set up during recording.

Tape recordings can be used again and again. A reel of tape was run more than 3000 times without any visible evidence of wear or any decrease in the fidelity of the sound.[1]

If, on the other hand, an error has been made or the recording is no longer needed, the magnetic image can be erased in a matter of seconds. Erasing makes the tape magnetically neutral and the tape is then ready for immediate reuse for other recordings.

Fig. 11.3 Most classroom tape recorders are placed in operation—recording and playing back—by adjusting a single control lever. Grade-school children can learn quickly how to operate a recorder.

USING THE TAPE RECORDER IN INSTRUCTION

The tape recorder, in the hands of an imaginative and creative teacher, can be used in a surprising variety of ways to improve classroom learning.

The teacher and some of the more mechanically inclined pupils can quickly master the steps involved in placing the microphone correctly in relation to the sounds or voices being recorded, in recording and playing back. Once this is done, the role and usefulness of the device are limitless. A few of many suggested ideas for effectively using the tape recorder are now presented.

[1] R. C. Brower, "Tape Recordings for Teaching," *Educational Screen*, February, 1950, p. 62.

The value of hearing oneself as others do, by means of tape recordings, was touched upon at the beginning of this chapter. This objective opportunity for self-criticism is valuable during the entire span of school experience. Its value first becomes apparent in the primary grades when the youngsters attempt to read aloud; when they engage in "Monday morning reports" of the weather, week-end activities, and events at home; and also when telephone-answering techniques are recorded and listened to.

Fig. 11.4. Hearing oneself frequently brings forth startling pupil reactions. What is the effect of such reactions on the usual pupil-teacher relationship patterns?

In the upper grades, panel discussions, reports of books read, discussions of the news, explanations of processes, and how-to-do-it accounts continue to demonstrate the true importance of *being able to get up on one's feet and express one's ideas verbally in a clear and well-organized manner.*

Children too often become so accustomed to a teacher's admonitions about improving speech or grammar that such remarks are no longer incentives to improvement. But the tape-recorded "voice," played back, frequently serves as a fresh new incentive. Errors of grammar and sentence structure and needless repetitions become painfully apparent when the child hears them committed in his own played-back voice.

"Do I sound like that? How can I have a better voice?"

"Do I talk *that* fast, that *slowly*, or with all those 'ah's,' 'er's,' and 'and-ah's'?"

No longer need the teacher alone make suggestions. With the tape recorder, the role of critic can include the class as well as the child himself who is being listened to via recorder playback.

In a closely related situation, group reports and discussions can become objects of improvement in which pupils participate. As both class

and the discussers listen to a taped discussion, the entire group can make judgments and recommend their own "cures."

Other applications of the tape recorder in language arts include its use in self-criticism in reading, choral speaking, play reading, etc.

IN MODERN LANGUAGE

Often the modern-language teacher is primarily an English-speaking individual. For this reason, both teacher and pupils can advantageously use the recorder for self-criticism of the pronunciation which is so important in mastering the conversational aspects of modern-language study.

Frequently the teacher will present prepared modern-language tapes[2] and follow this with free conversation which is recorded and then played back for group listening and criticism.

Raymond Petrie, audio-visual director of the Milwaukee Public Schools, reports this use of the tape recorder in modern-language instruction:

> My students had fallen into rather careless habits of reading Spanish. Their pronunciation and enunciation were careless but the chief difficulty was in phrasing. A number of them read sentences and paragraphs as though reading a list of words with about as much expression as they would read a grocery list. A recording was made and the students were horrified with the flat, monotonous, lifeless voices they heard. They realized, I believe, for the first time that merely pronouncing the words correctly and going at a fair rate of speed was not enough . . . that much more was desired.[3]

IN MUSIC

In beginning band and orchestra work, the thrill of listening to how they sound through tape recording playback can be a great incentive to the pupils to listen, evaluate, and practice, all to the end of better performance. Recordings of individual vocal and instrumental performances, quartette and choral singing, all allow the individual or group to listen, learn, and improve. Older pupils can carry on recording and playback activities independently.

Today many school music departments have tape recorders set up on which soloists can record their work, then listen and practice. This procedure places the responsibility on the learner and gives him the opportunity to advance as rapidly as he wishes.

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[2] EMC Modern Language Tape Series. See Source List, p. 558.

[3] R. M. Peterson and Raymond Petrie, "As Others Hear Us," *See and Hear*, May, 1951.

Fig. 11.5. "How do we sound?" The tape recorder gives the answer. Here a grade-school band practices; then it will stop to listen to the tape playback. What changes in the usual rehearsal procedures can now be expected?

IN GUIDANCE ACTIVITIES

A guidance director reports using tape for anecdotal records which are "filed" in the student's cumulative record folder. At one-year intervals the tape-recorded student reports and interviews are spliced end to end (Fig. 11.6) and wound around a flat cardboard "reel."

"Teachers," this director says, "are very willing to stop by my office, and as if they were chatting with me, record their comments on tape, knowing that I will add their 'tape' report to the progressively growing information record of a given student. At the time of graduation or on any occasion for listening, the tape record can be played back for parents, teachers, or pupil to listen to."

We are just beginning to realize the many important uses that can be devised for the tape recorder. Suppose that when Johnny comes to kindergarten, a simple conversation with him could be recorded. Suppose that as he goes from grade to grade, his oral speech habits, oral reading, and conversations revealing his interests, likes and dislikes, ambitions, and relationships with home, school, and friends could be captured on tape, placed in his record folder, and on graduation be spliced together as an audio document of his school life and progress. Imagine the interest of his parents, and possibly an employer, in such a document.

For students about to start working after high school, the tape recorder is valuable. After the guidance director determines what kind of employ-

ment offers the best opportunities for the student, both the student and his instructor may engage in role playing, the instructor taking the part of an employer interviewing the student about a job. The taped interview is then played back for criticism.

Actual employers may be asked to appear before the class and conduct an interview with one of their own employees or a pupil. This also is taped for later study.

IN BUSINESS EDUCATION

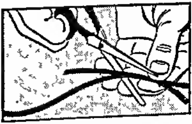
Speed tests, vocabulary and spelling drills all lend themselves admirably to prerecording on tape. In typing and shorthand classes a tape recording, carefully worked out in advance by the teacher, can be used repeatedly to measure the speed and accuracy of various classes.

In order to give his pupils experience in doing typing and shorthand in actual business situations, a commercial teacher arranged for each of fifteen local businessmen to dictate on tape three letters of varying length and difficulty selected from his own files. The resulting forty-five letters were a challenging and exciting variation from the regular class routine and gave the class a realistic idea of the requirements expected by business firms. Similar tapes for use in

Fig. 11 6.

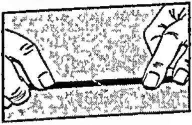
Here's how to make tight, noise-free splices:

1.



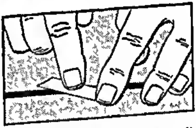
Cut tape at 60° angle with an overlap so ends will line up. (Cutting tape at 60° angle will eliminate detection of splice on recording.)

2.



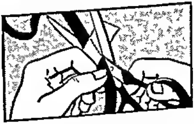
Align both ends of tape, uncoated side up (shiny on plastic, grey on paper.)

3.



Cover aligned ends with "SCOTCH" Splicing Tape, evenly and securely.

4.



Trim off excess splicing tape. (Cut into the recording tape backing very slightly as illustrated by dotted lines. This eliminates possibility of a sticky splice.)

Fig. 11.7. A short speed test recorded during class can be used later as drill material to increase speed and accuracy in typing and transcribing.

business education have also been commercially recorded recently.[4]

Other uses of tape recording in business education include taping business telephone conversations, employer interviews at local business firms, and both imaginary and genuine sales talks, the latter recorded by local sales persons.

IN DRAMATICS AND SPEECH

Unusual examples of speeches, debates, reporting, or dramatics are frequently heard on radio or television, and these can be useful in teaching speech or dramatics. Most tape recorders are equipped with a radio take-off line, a length of wire with a plug-in device at one end and twin metal clips at the other. By attaching the clips to the "voice coils" of the radio (ask the physics teacher for help) and then plugging in the

[4] *Gregg Shorthand and Dictation* series, McGraw-Hill Book Company, New York.

Fig. 11.8. What opportunities, unique to the use of tape recordings, can be developed in speech correction work?

tape recorder, the teacher can tape an address by the President of the United States, the audio part of a television drama, a panel discussion, or a well-delivered commercial.

Any of these may become teaching materials at the right time and under the right circumstances. Used as models, such tapes can help pupils make judgments about good speaking, clear enunciation, pleasing phrasing and voice intonation, vocabulary choice, and sentence structure.

When a tape recorder is used during a rehearsal of a play, the members of the cast can gain a vivid idea of their strengths and weaknesses from the playback.

In a large urban high school the confusion and noise in the halls were reaching unwarranted levels. The student council decided to act. Quietly but with great effectiveness they recorded typical hall and stairway noise while classes were changing. The recording was played back at the next

meeting of the council and they were asked: "Do we want this in our school?" As a result the recording was played at the next school assembly and the same question was asked. A month later another recording was made—the reduction in noise was amazing.

PRERECORDED TAPES

Today, a new kind of audio learning material, the prerecorded tape, is rapidly bidding for the attention of the teacher for classroom use (see page 281).

As was said in Chapter 10, audio learning experiences have traditionally

Fig. 11.9. Pupils in the most remote one-room rural schools can now enjoy interesting and effective audio learning experiences brought to them on prerecorded tape recordings.

been available on records or transcriptions. Today programs as varied as *Reading Exercises in Beginning German* and the selected piano concertos of Bach are available as tape recordings at prices which permit a school to create its own library of prerecorded tapes.

Such taped programs are selected and used just like records, transcriptions, and radio programs. Audio programs on tape, however, are practically indestructible, for they are not subject to surface noise, scratching, or dust.[4]

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[4] See Source Lists, p. 557.

SELECTING AND OPERATING THE TAPE RECORDER

The tape recorder has captured the imagination of both teacher and manufacturer. As a result, well over 75 models are today being manufactured and distributed.

Developments in this field over the past few years have made it possible for a teacher to secure tape recorders which in one compact unit include speaker, microphone, and recording and playback mechanisms. Current models are simple to operate, rugged, attractive, and inexpensive. (See Fig. 11.10.)

The teacher should ask for a demonstration in order to determine which recorder will be best for the type of use he anticipates needing. Because any equipment may get out of order, service that insures the quick return of the tape recorder to service is imperative.

In addition, the teacher should ask such questions as these when selecting a tape recorder.

1. Is the tape recorder simple to operate?
2. Do the voices or sounds on the playback closely approximate the original in tone and quality? Is this true of small groups as well as of individuals?
3. Will the recorder operate at both slow and fast speeds?
4. Is the recorder easy to handle? Portable?
5. Will the dealer provide overnight service in case of breakdown?
6. Will the dealer show the teacher and some of his pupils all that needs to be known about operating the equipment, placing the microphone, etc.?

OPERATING THE TAPE RECORDER TO ACHIEVE "PRESENCE"

With the appearance of each new instructional device the teacher assumes added responsibilities. He must learn new techniques when he uses tape-recording equipment, but he knows he will be well rewarded in terms of increased pupil achievement.

In using a recorder in the classroom, the teacher is concerned with whether the playback sounds "real" and "natural." When the recorder is used for evaluation, the recorded sounds must duplicate the original as completely as possible; in other words, the recorder must achieve "presence."

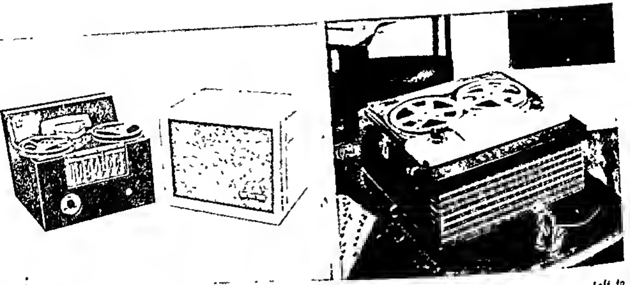


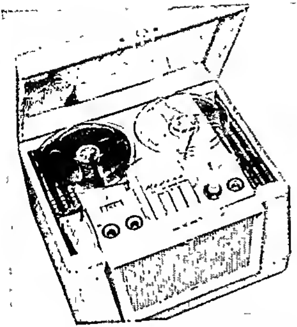
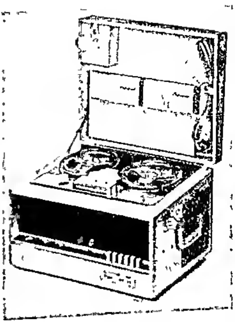
Fig. 11.10. These tape recorders are representative of those currently used in classrooms. Left to right: EMC playback only; Webcor; Revere; Bell & Howell.

Presence or lifelikeness in the recorded image is essential if the recorder is to be used in school work. If the vocalizations of students, either word of mouth or song, are to be evaluated, presence must be attained in recording. If choral work and instrumental and orchestral arrangements are to be evaluated, if music is to be analyzed in terms of timbre, pitch, intonation, volume, or expression, presence must be attained in recording. Attaining naturalness in recording is not so technical a problem as to be outside the ability of the teacher.

The teacher will soon discover that there is more to using a recorder than merely putting a microphone in front of an individual or group. To attain presence, he must know something about microphone placement.

In placing the microphone, the teacher is at first likely to depend on his own hearing. He does not realize that sound heard by two ears is entirely different from that "heard" by a microphone. Our ears and mind possess the ability to concentrate our attention on the one person who is talking to us even though the room is filled with chatting people. We have trained ourselves to disregard extraneous sounds. The microphone, on the other hand, in monaural—as if one ear were listening and that ear made no discrimination. Every sound that reaches it is picked up. Not so with the human ear.

To test this, place a microphone in a room in which a crowd of people are talking freely with one another; record the sound. The result will be

a jumble—a completely indistinguishable jumble. As a further test, while speaking to a person in the presence of others who are also talking, put your hand over one ear and note how his voice suddenly fades away and mixes with the other sounds in the room. Hence it is important to remember that *a microphone has no power to differentiate between sounds.*

In placing the microphone, move around to various spots and listen with one ear. In this way you will hear much as a microphone does. Thus you will be able to judge what it will "hear" and accordingly place it to best advantage.

While you are deciding where to put the microphone, roughly divide the space that will be occupied by the speakers and performers into five or six imaginary squares. Put the microphone in the center of each of these squares and test the results on the recorder. You will soon become exceptionally good in judging about locating the microphone.

ACOUSTICS

The acoustics of the room or recording area should be studied. Ordinarily the microphone should be located a good distance away from reverberating surfaces. Corners of the room should be avoided, as should proximity to hard, flat surfaces.

You can soon distinguish between a "live" room and what is known as a "dead" room. Unfortunately, most teachers have to contend with classrooms which have poor acoustics. The usual classroom is "live," characterized by hard plaster wall and ceiling surfaces. A "live" room is likely to be filled with reverberated or echoed sound waves which cause confusion as they enter the microphone. Such a classroom can be made less "live" by drawing the shades, or, if there are draperies, spreading them out over as large an area as possible. Wall hangings, cloth-covered screens, and other surfaces which can be hung temporarily with sound-absorbing material will also help remarkably.

In contrast to this is the "dead" room. Such a room may be crowded with rugs, draperies, and overstuffed furniture, and its ceilings and walls may bave good acoustic properties. Here, however, there is an undesirable amount of sound absorption which results in "hollow barrel" recordings. Once simple trial and error has revealed the sound-reflecting surfaces, the hollow recordings can be avoided by placing the microphone properly.

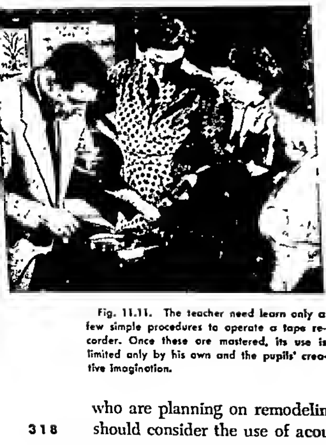


Fig. 11.11. The teacher need learn only a few simple procedures to operate a tape recorder. Once these are mastered, its use is limited only by his own and the pupils' creative imagination.

After the acoustic properties of the classroom are known, recommendations may be made concerning the bettering of poor acoustics. If the room is too live, thick acoustic tile may be installed on the ceiling. Usually this is sufficient, but sometimes additional panels are needed on one or more walls. In rooms which are too dead—this is the exception—drapery materials may be removed or some acoustic tiles removed. Those who are planning on remodeling present schools or building new ones should consider the use of acoustic plaster for the ceiling surfaces.

RECORDING LEVEL AND TONE

Recording level refers to the volume at which a recording is made. The higher the volume control is set, the greater the "pick-up" range of the microphone.

A teacher complained that playground noises outside the building were being recorded along with the songs two children in the classroom were singing. Obviously, the volume control was set at high or maximum, with the result that the mechanical ear, the microphone, was reaching out far beyond the walls of the classroom to gather in every sound. To help here, most machines have visual signals which wink or glow when the recording level is correct. But the best procedure is to experiment with volume settings until good results are achieved.

Fig 11.12. This portable tape recorder is being used to record bird calls. The parabolic microphone is aimed at the distant sound source to gather it in, and at the same time exclude unwanted sounds.

Tone refers to the treble or bass quality of the voice, music, or other sounds picked up by the microphone and recorded. The tone quality can be controlled by adjusting or rotating a tone control on the tape recorder. Short test recordings and a little experimenting—perhaps more or less treble or bass—will reveal when the tone setting is correct.

Recording level and tone are so flexible that the tape recorder has many special uses. The sounds of a busy business district, the whir of

machinery in a manufacturing plant, the sounds in a dairy building—even bird calls—may be tape recorded for classroom use.

SUMMARY

Today it is possible for teacher and pupil to hear themselves as others hear them. The tape recording instrument has as many uses as the ingenious teacher finds need for. By means of tapes he can secure instructional control, evaluation, and analysis in a degree heretofore impossible.

The tape recorder is well adapted for work in speech, in evaluating and improving diction, voice, intonation, enunciation, and general speech patterns. It is invaluable in the field of foreign languages, where mimicry is often the means of improving pronunciation. In reading and in extemporaneous discussion on the part of both teacher and pupil, recording offers many possibilities.

In music, whether it be individual performance, string trios, quartets, double quartets, or full orchestras, the tape recording can become an inspiring and realistic means of evaluation, instruction, and improvement. Individual and group performance—vocal, choral, and instrumental—can be judged, discussed, and ultimately improved by means of recordings. The tape recorder is of value in teaching, regardless of grade level or subject area. The extent of its use depends on the teacher's understanding of the basic characteristics of the technique and his insight into the never-ending opportunities thus made possible.

Taped dramatizations and interviews can go beyond the school to the community as reports of progress for parents.

In selecting tape recording equipment, the teacher should consider the ease of operation and maintenance and above all the ease and speed with which the recorder can be repaired when something goes wrong. The carefully selected, effectively maintained, and wisely used tape recorder can become a valuable part of the classroom equipment.

Suggested Activities

1. As a practice teacher or a teacher in service, plan for the actual use of the tape recorder in enriching learning opportunities in your subject area. Include a statement of objectives and a description of the recording activity you will use. Also describe the physical and mechanical arrangements for using the tape recorder.

2. Set up a tape recorder in any normal classroom situation. Later, in private, listen to the playback and ask yourself such questions as these: Is my speech pleasant? Is my enunciation clear and understandable? Is my manner toward children pleasing? Can I learn anything from the children's responses to my questions and leadership?
3. As a teacher, anticipate the problems in language arts, music, or general learning that will arise next week, and make plans for handling them; use the tape recorder.
4. List the ways in which you feel that the use of a tape recorder may be important to your colleagues who are not now using one.

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12.

Still Projection

THE STARTING BELL INTERRUPTED A GROUP OF STUDENTS RATHER ANI-matedly discussing a motion picture they had seen the night before at a downtown theater.

"I still say it was the bunk. Nobody lives on the planets."

"Who says so? For all we know there might be people there."

"Anybody want to try a space-ship ride to find out?"

Noting the end of the conversation with some amusement as the class went to its seats, the physics instructor decided to investigate the possibilities of developing this rather evident interest in space travel into something worth while. A few questions revealed a general curiosity about the subject and a desire to find out more about rockets and space satellites.

The next morning after the class assembled, the lights were turned off and the instructor flashed a picture on the screen with the comment, "I thought you might he interested in seeing a *real* rocket in action. This one went up to a height of 158 miles and took the highest photographs ever taken of the earth. I found these pictures in a magazine last evening." (Fig. 12.1.)

The lively discussion that followed resulted in planned investigation, reading, and reports on the subject of rockets. A few days later one committee used a filmstrip in its report on what scientists think about the future of rocket travel (Fig. 12.2). . . .

As the children settled into their little circle of chairs, Miss Miller started discussing a subject they had been talking about for several days in their reading class.

"Now, children, what did we see with Peter and Susan yesterday on their grandfather's farm?"

"We saw their grandfather," said Fred. "A cow," said Mary. "A sheep

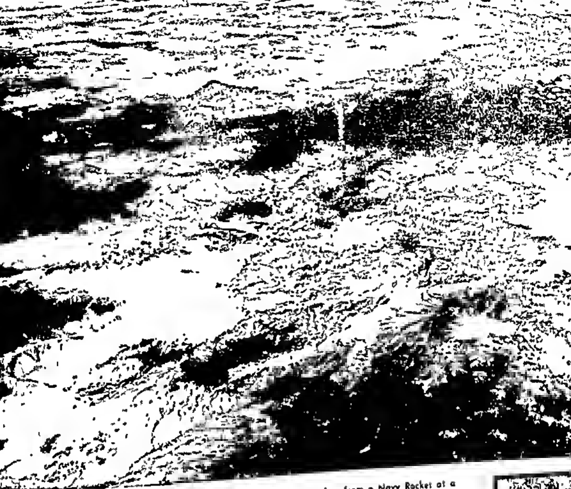

Fig 12.1. This picture, taken from a Navy Rocket at a height of 96 8 miles, shows Arizona in the foreground and California and the Pacific on the horizon. At the extreme lower left is a railroad track that winds toward Tucson (about a third over from the left and a third down from the top). Phoenix is to the right of Tucson and slightly above it. The white patches at the right are clouds.

and some pigs," said a third youngster. "There were little pigs and big pigs," volunteered another. Eager responses came tumbling out from most of the boys and girls.

"Now, what were we about to see with Peter and Susan when our reading period ended yesterday?" Again there was a flurry of hands. Miss Miller called on

Fig. 12.2. When further information and detailed study of rockets and space travel are called for, a filmstrip such as this one may be very appropriate.

Joanne, a shy little girl with big eyes.

"We were going to see the barn," said Joanne.

"Yes, Joanne. I wonder what the barn will look like. Who has seen a barn and can tell us what it looks like? What is inside?"

Miss Miller went to the chalkboard and wrote the words BARN, RED, BIG, HAY, COWS, HORSE, and a few others as they came up in the children's discussion.

"Now shall we see if we can find all these things with Susan and Peter when they go to their grandfather's barn? Fine. And maybe we'll find some other things too. We'll look very closely, won't we?

"Very well. Who would like to close the shades? Jack and Joanne. And you may switch off the lights, John."

Thus the stage is set by one primary teacher for an exciting adventure which will give pleasure to her pupils and explain several new concepts to them. Later in the spring she will take them to visit a real farm. Meantime, however, she makes good use of a color filmstrip that is correlated with one of their books in natural science.

Next week a motion picture is scheduled which will give additional new meaning to life on a farm in the spring. At the moment, however, this teacher wants to present the meaning of new terms at the children's own rate; hence she uses a filmstrip so that

each picture may be discussed as long as necessary. What other advantages might a filmstrip have in comparable teaching situations?

FILMSTRIPS

TERMINOLOGY

A variety of names have been used for filmstrips, among them "stripfilms," "slidefilms," and "filmslides," besides various trade names. Such variation creates unnecessary confusion about a valuable teaching tool. Most frequently used, however, is the term "filmstrip," and accordingly it is used throughout this book.

Fig. 12.3. A filmstrip should be handled by the edges as is being done here. Handling it in this way also enables you to get a quick look at the content. A viewer is generally necessary for detailed examination.

PHYSICAL CHARACTERISTICS

A *filmstrip is a related sequence of transparent still pictures or images on a strip of 35 mm. film* (Fig. 12.3). The pictures may be in color or black and white. They may be single or double frame in size; (a single frame is approximately ¾" x 1"). Most commercially produced filmstrips have *single-frame* pictures. It makes little practical difference to the teacher whether single- or double-frame filmstrips are used, for the same projector can ordinarily be used for both.

A filmstrip typically contains from 20 to 50 frames, although it may have more. A complete filmstrip is usually several feet in length, and is easily rolled up to fit into a small metal container. Filmstrip containers take up little space and can be stored readily (Fig. 12.4). The cost is low enough so that it is practical to keep sets of filmstrips in each classroom for use when needed.

Some filmstrips are accompanied by records. These filmstrips are called

sound filmstrips. The record usually carries narration and may also include appropriate music and sound effects.

An audible signal on the record is generally used to indicate when the next frame should be shown. Record speeds are usually 33⅓ or 78 r.p.m. The 33⅓ records are preferable because fewer records and record changes are necessary during a showing. A 12-inch microgroove record, for example, plays approximately twenty minutes per side at 33⅓ r.p.m.

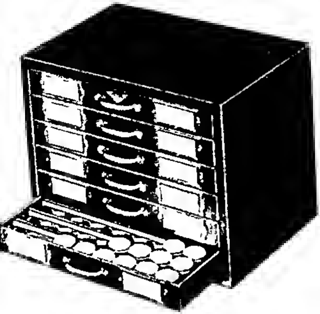

Fig. 12.4. One advantage of filmstrips is suggested in this compact cabinet. What are some of their other physical advantages?

Combination record players and filmstrip projectors such as the one shown in Fig. 12.5 are convenient and compact. However, a record player and projector that are separate can be used without difficulty. The record player should be adjustable to several speeds and should have a microgroove-type playing head as well as a standard needle for other than long-play (LP) records, namely, the older-type 78 r.p.m. records.

Sound filmstrips are valuable in providing standardized instruction. Such instruction is necessary for certain technical and industrial processes such as the assembly of a carburetor or the teaching of recommended sales techniques. The sound filmstrip has accordingly been extensively used in industrial and military training programs where uniformity is of primary importance.

For school use, sound filmstrips have frequently been found more satisfactory when the record is turned off and the teacher or a student provides the "sound." This procedure preserves one of the principal advantages of the filmstrip, namely, its adaptability for use at the speed desired. Thus the sound filmstrip becomes essentially a silent filmstrip. There are few explanatory captions, because most sound filmstrips contain no subtitles.

Sound filmstrips are likewise useful in such school activities as music, reading readiness, industrial arts, and guidance. Although the pace of a

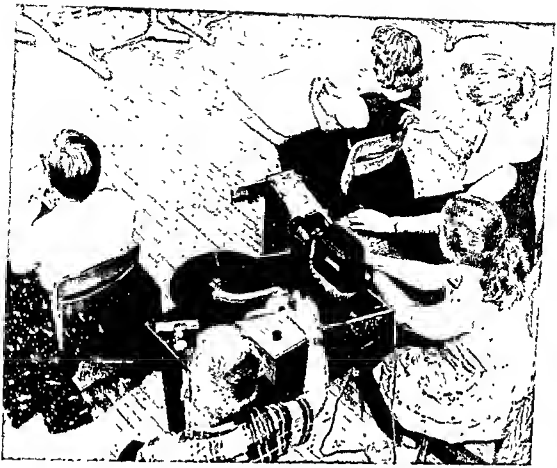

Fig. 12.5 What unique contribution can the sound filmstrip make to classroom and adult group situations?

sound filmstrip is fixed by the record, this medium provides unique benefits, combining some of the advantages of both the recording and the silent filmstrip.

INSTRUCTIONAL CHARACTERISTICS

Of the several physical characteristics already discussed—the filmstrip is easy and convenient to use, takes up little space and is easily stored, is inexpensive, is available in either color or black and white, and can be used at any desired pace because the pictures can be left on the screen as long as the instructor desires—the last point is of particular significance in many teaching situations.

Three other characteristics have a bearing on the usefulness of the filmstrip in instruction. The pictures are in sequence, the room needs to be only slightly darkened, and filmstrips are available for a wide range of grade levels and subject areas.

Sequential Order

The sequential order and unity of the filmstrip are one of its principal instructional characteristics. It is designed to tell a story or a unified segment of a story. It proceeds step by step from the beginning to the conclusion. The order of pictures and titles is determined by the purpose of the strip and the nature of the subject.

For example, *Peter and Susan Visit Grandfather's Farm*[1] is designed to provide background experience for a primary reading class. Hence the scenes are set up in a sequence which provides an ordered series of new word concepts about a farm. At the same time the filmstrip tells a story in an interesting manner so that the pupils are led naturally from one part of the farm to another without being aware of any pattern.

Another filmstrip, *The Micrometer,*[2] is designed to show the correct method of using and reading a technical instrument. It proceeds logically from the first to the final step in reading a micrometer. The last frames review the salient points.

In both these cases there is an ordered sequence of scenes and titles that is fixed according to the instructional purpose for which the filmstrip is designed. What are some of the distinct advantages and possible disadvantages of this fixed order of scenes in a filmstrip?

Room Darkening

One of the major advantages of the filmstrip is that it can be used effectively in a semidarkened room. So long as the screen surface can be protected from strong, direct light, satisfactory black-and-white projection can be accomplished without difficulty. The projection of colored filmstrips requires a darker room for equally effective results because color emulsion is several times thicker than the black and white emulsion, and there is consequent reduction in brilliance of the projected image.

[1] Society for Visual Education.

[2] United World, Government Films Division.

Wide Range

The increasingly wide range of filmstrips available to the teacher is another point in their favor. Heavy demand and relatively low production costs have encouraged producers to turn out large numbers of filmstrips on virtually every subject for the various grade levels. An idea of their scope is given by Figs. 12.6 and 12.7. Sources are listed on pages 544–546.

An interesting development in this connection is the extent to which publishers of textbooks are producing filmstrips closely correlated with text materials. A similar tendency is evidenced in the production of 16 mm. teaching films correlated with textbooks. Both represent a healthy trend toward the more integrated use of several kinds of instructional materials based on the particular contributions to learning offered by each one.

LIMITATIONS OF FILMSTRIPS

Like any other teaching material, the filmstrip has limitations as well as advantages.

1. Filmstrips are a "still" medium. They cannot portray motion effectively and are not intended to do so. If motion is necessary for comprehension, a motion picture should be used. Once the motion aspect is understood, however, the filmstrip is excellent for detailed study and review. For this reason film and filmstrip make a good instructional "team."

2. The order of scenes on a filmstrip is fixed. It is not possible to change the order or to project scattered scenes conveniently. Separate slides are preferable in the latter case, since slides can be shown in any order desired.

3. Filmstrips are rather easily damaged and difficult to repair. The base of a filmstrip is cellulose acetate, a substance which is resistant to ordinary wear and tear and is also noninflammable. The sprocket holes will break easily, however, if the projector is not properly threaded or is out of adjustment. Unfortunately there is no practical way of repairing damaged sections. Since damage of this kind ordinarily occurs on the leader strip while the projector is being threaded, it can usually be detected before the picture section itself is damaged. Rubberized rollers or other substitutes for sprockets may sometime provide a solution to the

problem of sprocket-hole damage. Meantime, reasonable care in using the projector will hold such damage to a minimum.

FILMSTRIP AND 2" X 2" SLIDE PROJECTORS

A filmstrip projector (Figs. 12.8 and 12.9) is essentially a simple mechanism. It consists primarily of a lamp, a reflector, a series of lenses, and a smooth channel for the film. Near the base of this channel is a knob which is turned by hand to pull the filmstrip through the projector. The knob turns a sprocket wheel whose teeth fit into sprocket holes on the filmstrip. The projector is easy to operate and is inexpensive and light in weight—all points of practical importance.

Filmstrip projectors usually have attachments which can be inserted to project 2" x 2" slides. The slides are placed in the slide carrier and changed by shifting the sliding section of the carriage from one side to the other. Some projectors contain cartridges into which a complete selection of slides can be loaded in advance. The projector can then be operated either manually or by remote control (Fig. 12.10). Since the picture on a 2" x 2" slide is identical in size with a double-frame picture on a film-

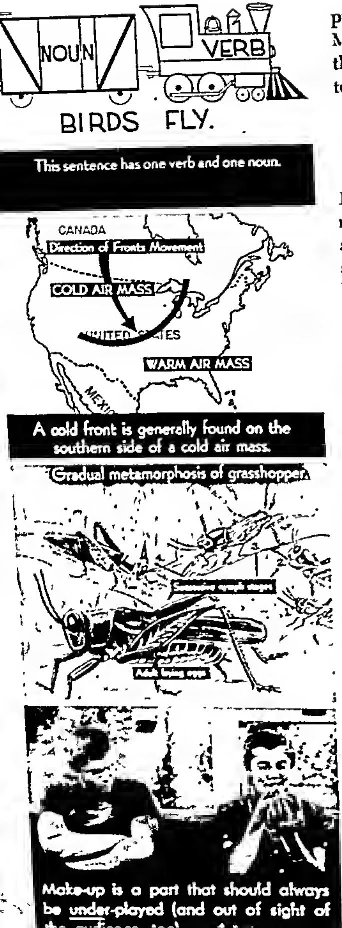

Fig. 12.6. These selections from four filmstrips suggest something of the variety of materials available in this versatile medium

strip, the same lens and light system is suitable for both.

SELECTION OF FILMSTRIP AND 2″ x 2″ SLIDE PROJECTORS

Filmstrip and 2″ x 2″ slide projectors vary somewhat from one make to another as to threading, ease of interchanging the slide carriage and filmstrip mechanism (in combination-type projectors), brilliance of the projected image, projection lenses, and quality of the cooling system. Each of these factors should be considered in selecting a projector.

Threading

Most filmstrip projectors are threaded by inserting the film into the film channel from above and pushing it down to engage the sprocket teeth. This method has the advantage of insuring correct alignment in the film channel and proper engagement with the sprocket teeth. Since the sprocket holes on filmstrip are easily broken, ease of threading the projector is an important consideration.

Interchanging

A related factor on combination filmstrip and 2″ x 2″ slide projectors is the ease with which the slide carriage and filmstrip fittings can be interchanged. The increasing number

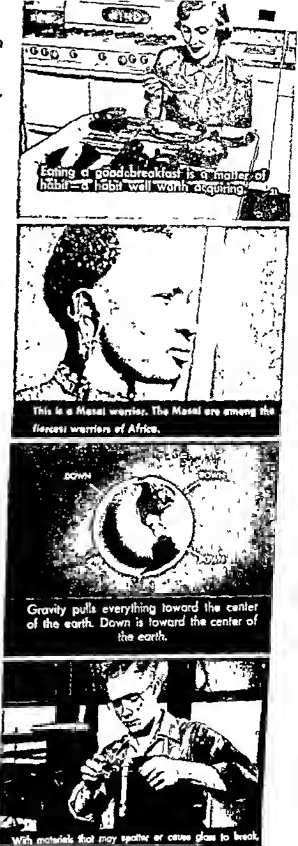

Fig. 12.7. What opportunities for enrichment are offered by a range of filmstrips such as is shown here?

of double-frame filmstrips being produced in such fields as agriculture and conservation makes it highly desirable for filmstrip projectors to be easily adjustable for either single- or double-frame use.

Brilliance of Image

The intensity of light determines the brilliance of the projected picture on the screen and hence the degree of darkness necessary for effective projection. Light intensity is determined primarily by the power of the projection lamp and the quality of the lens system. Although projectors with 300-watt lamps are available, 500-watt projectors are usually more satisfactory for all-around use. With large groups, as in an auditorium, a 1000-watt projector is needed for best results. The lens system is almost as important as the power of the projection lamp in obtaining a brilliant image on the screen. Lenses are discussed in the following section.

Brightness of the screen over the entire picture area is the most important single factor in projecting filmstrips and slides effectively. The most satisfactory way to compare brightness is to test the several projectors being considered by projecting the

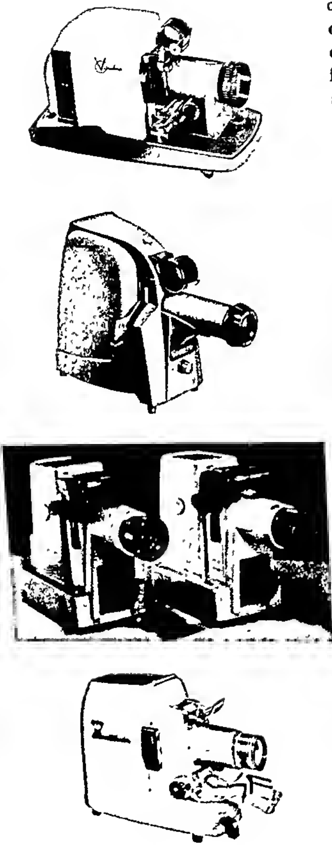

Fig. 12.8. The teacher has various good filmstrip projectors from which to choose. What are the important considerations in selecting this equipment? *From top down: Viewlex; American Optical; Eastman Kodak Company; Society for Visual Education, Inc.*

same picture in color simultaneously on two or three projectors side by side.

Projection Lenses

The focal length of the lens, the size of the aperture, and the distance from projector to screen determine the size of picture seen. It is normally desirable to project from the rear of the classroom to avoid distracting pupils or blocking the view of those who are seated behind the projector. For these reasons, the length and size of the projection should be considered when purchasing a projector.

Most filmstrip projectors are equipped with a 5″ projection lens which produces a single-frame image 42″ x 55″ from a distance of 25 feet, and an image 48″ x 65″ from 30 feet. While the 5″ lens is suitable for most classrooms, a 7″ lens is preferable for larger classrooms and assembly rooms. With this lens a projector 50 feet from the screen provides a picture 58″ x 77″.[3] At this distance the picture projected by a 5″ lens would be too large for the average portable screen. Hence if the same projector is to be used in both large and small rooms, it is desirable to have more than one lens. Another advantage of the 7″ lens is that it projects a 2″ x 2″ slide picture that is approximately the same size as a 16 mm motion picture projected from the same distance with a standard 2″

[3] The figures given are for the usual single-frame filmstrip. Double-frame filmstrips and 2″ x 2″ slides provide pictures which are 4.5′ x 6.5′ at 25 feet, 5.4′ x 7.8′ at 30 feet, and 9.0′ x 13.0′ at 50 feet.

Fig. 12.9. This teacher sets the pace of using filmstrips in terms of class discussion and questions.

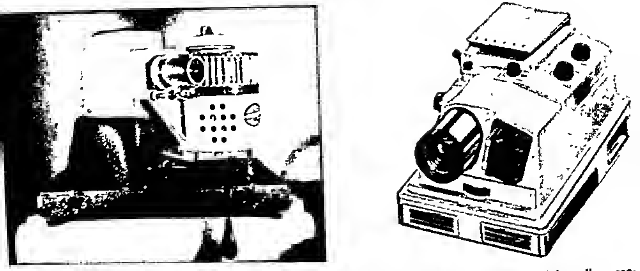

Fig. 12.10. These 2" x 2" slide projectors operate automatically. Cartridges of slides allow continuous operation. With a remote control attachment (left) the projector can be operated from some distance away. When might this be useful?

lens. If a teacher wishes to use both slides and motion pictures in a lesson, the two projectors can be placed side by side.

Cooling Systems

Since one of the significant instructional advantages of the filmstrip is the fact that pictures can be shown on the screen as long as desired, an efficient cooling system is essential to carry off some of the intense heat generated by the lamp. Prolonged exposure to excessive heat causes a filmstrip or slide to blister. Once damaged in this way, it is no longer satisfactory for use. The alternative is to avoid leaving a picture on the screen for more than a minute or two, but this may not be long enough for the teaching need.

Filmstrip and slide projectors are usually equipped with an electric fan for cooling. Some of the older projectors, however, have only a series of metal plates to absorb and disperse the heat. Since the fan forces a steady flow of air through the lamp house, fan-equipped projectors are preferable.

Another factor is the quietness with which the cooling fan operates. Some noise is inevitable, but good engineering on most projectors has reduced the noise factor to a minimum.

USING FILMSTRIPS AND SLIDES EFFECTIVELY

The value of filmstrips and slides in teaching numerous subjects at levels ranging from primary grades to the college and adult level has

Fig. 12.11. The quality of photography on a filmstrip should be uniformly good. The picture being projected here has good photographic characteristics. What are they?

been studied both here and abroad for many years.[4] Such subjects as economics, history, social studies, spelling, health, map reading, elementary mechanics, nursing, and armed forces training were included. In general, these conclusions are apparently supported by the research evidence.

1. Filmstrips and slides are effective means of communicating factual information and certain skills. However, a combination of these media with sound films or other materials is usually superior to any one medium alone.
2. The extent to which filmstrips or slides embody *unique* pictorial content of good quality has a direct bearing on their effectiveness in teaching.

[4] An excellent summary of the research done since 1947 on the effectiveness of filmstrips and slides will be found in William H. Allen's article on audio-visual materials in *Review of Educational Research*, April, 1956, pp. 131–133.

As is true of other teaching materials, however, filmstrips and slides must be *used* effectively if they are to provide the maximum benefits.

SELECTION

The first step in efficient use involves deciding whether the filmstrip can serve the teaching purpose better than any other available device. This must be decided in terms of what the filmstrip can and cannot do, i.e., its inherent characteristics. These will be reviewed in the form of several questions which the instructor might well ask himself.

1. *Is the purpose for which I wish to use this filmstrip one in which motion is essential for pupil understanding?* If so, the filmstrip is not the best medium because it is a still-picture medium. On the other hand, if the motion aspects of a subject such as a gasoline engine have already been presented by a film or a cutaway model, and the immediate purpose is to obtain a more detailed understanding of the operating parts of the engine, the filmstrip may serve the purpose very well.

2. *Does the purpose involve a series of step-by-step developments, one leading to the next in logical sequence?* If so, the filmstrip is well suited, because it is usually designed to tell its story in a series of related steps. But if sequence is not important, slides may prove more useful.

3. *Are suitable filmstrips available for the particular teaching job I have in mind?* This is a question of practical import to most teachers because keeping track of the large number of new filmstrips in any given field is a considerable task. Professional journals frequently contain sections that review new films and filmstrips. In addition, several publications provide periodic evaluations of such materials; these are listed in the footnote on page 544.

The importance of careful selection of filmstrips for effective results is suggested by three studies in the areas of economics, geometry, and the social studies. All three raise the question of the uniqueness and quality of the filmstrips that were used.

In a study comparing the use of four filmstrips with lectures in teaching economic concepts to university students, Stampolis and Sewell[5] found one case in which the filmstrip was significantly superior, and three cases in which there was no difference.

[5] Anthony Stampolis and Laurence S. Sewell, Jr., *A Study of Film Strips Communicating Economic Concepts*, School of Public Relations and Communications, Boston University, Boston, 1952.

Johnson[6] found that a combination of three motion-picture films and three filmstrips definitely improved retention and ability to apply geometric principles and facts regarding circles. Neither films nor filmstrips alone produced comparable results. The initial learning of facts and problem-solving skills in geometry was not increased by the use of films and filmstrips, but Johnson suggests that this may have been due to the fact that the materials themselves were similar in nature to those commonly found in textbooks or drawn on the blackboard by the teacher.

Vandermeer similarly stresses the fact that the pictures on a filmstrip must contribute something unique if the filmstrip is to be any more effective than words in the learning situation. He compared results, in terms of immediate factual learning and recall of information over a three-week period, from using a particular American history filmstrip with one group and only the reading material from that filmstrip with another group. He found no significant superiority for either group. In assessing his findings Vandermeer came to the conclusion that ". . . when the pictorial element of the filmstrip is deficient in detail, definition, or clarity, it not only fails to contribute to the students' knowledge but may actually serve to inhibit learning."[7]

In a word, to secure effective results, the instructor must first select filmstrips which tell their story primarily through pictures rather than words. Second, the pictures must be of such nature and quality as to contribute something at once significant and unique to the learning situation. These two principles probably apply with equal validity to any type of still picture used in teaching.

PREVIEW

A second step in using filmstrips effectively is for the instructor to preview carefully those selected, for the purpose of preparing himself. He must know rather precisely what the filmstrip contains in planning how to use it with his pupils, what points to emphasize, and what points require additional clarification.

The preview likewise enables him to decide when to use the filmstrip

[6] Donovan A. Johnson, "Are Films and Filmstrips Effective in Teaching Geometry?" *School Science and Mathematics*, October, 1950, pp. 570-574.

[7] A. W. Vandermeer, "Relative Contributions to Factual Learning of the Pictorial and Verbal Elements of a Filmstrip," *School Review*, February, 1950, pp. 84-89.

to the best advantage. Is it stimulating enough for the introduction? Does it fit well into the body of the lesson? Is it best suited to the summary and review? Or can it be used to advantage at several points and for more than one purpose?

CLASS PREPARATION

Having determined, after previewing the filmstrip, how he will use it in the lesson, the instructor must prepare the class to see it. There are several ways in which he can accomplish this.

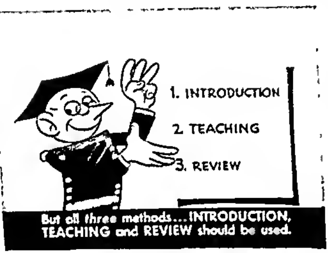

Fig. 12.12. This frame from the filmstrip *Teaching with the Filmstrip* suggests several ways in which filmstrips can be used.

1. *He may explain why the pupils are shown this filmstrip at this particular time.* This may call for only a brief statement or it may require extended discussion. The point involves pupil readiness. It depends somewhat on the interest already present and on previously acquired information about the topic. It is not a separate, distinct step but rather part of the motivation process. The important point is that the students *want* to see it for reasons of their own.

2. *He should indicate clearly what to look for.* How an instructor uses a filmstrip or any other kind of teaching material naturally depends on *why* he is using it—in other words, his specific objectives. Should his purpose be to provide a general overview and arouse interest, he may indicate general rather than specific points to be looked for. On the other hand, if he wants to clarify certain definite concepts, he will wish his students to be alert for the answers to specific questions. For example, in using *The Slide Rule—Multiplication and Division*,[8] the mathematics instructor might well ask in advance such questions as the following:

a. What two scales on the slide rule are used for multiplication and division?

[8] U.S. Office of Education; available from United World Films.

b. How should the scales be lined up to multiply? To divide?
c. How and where is the result found?

3. *He should anticipate new or difficult words, phrases, and symbols.* Unless the primary purpose of using a filmstrip is to teach new word concepts, as in a reading lesson, it is essential to remove in advance such barriers to learning as new words and symbols. This cao be done through discussion, use of the dictionary, and illustrations. The new concepts will then be applied promptly when the filmstrip is shown, and they are likely to be well learned as a result. Of much greater importance, however, is the pupil's improved comprehension of content made possible by the removal of vocabulary barriers.

PRESENTATION

Mechanical as well as instructiooal considerations are involved in the effective use of filmstrips and slides.

Most teachers quickly sense the convenience, as well as the great effectiveness, of having all their teaching materials ready for use at the beginning of the period. The filmstrip or slide projector can be set up and tested in a few minutes, so that at the proper moment a flick of the switch will bring the first picture to the screen without delay and confusion.

More important is the fact tbat when everything is in readiness, lesson interruptions are held to a minimum. The filmstrip, slide, or other projected medium fits smoothly and naturally into the learning experience. It assumes its proper integrated role in helpiog to put across certain ideas without attracting undue attention to the operator or the projector. The instructor is not forced into the unhappy position of saying, "And now, boys and girls, we are going to see some pictures of the Monarch butterfly"—while adding fervently to himself, "I hope."

The Captions

What should be done about the captions? Does the teacher read them aloud or does he leave them on the screen long enough for the slowest readers to comprehend them? The following discussion between a friendly supervisor and one of his teachers throws some light on this problem:

"Well, John, let's back up a bit. Why are you using this filmstrip at this point? As an introductory overview perhaps? If so, it is quite appropriate

to read the titles as you go along. It saves time, keeps things moving, and, most important, it assures everyone's following the story as it unfolds on the screen.

"On the other hand, if you are using the filmstrip as a basis for discussion and the students have already seen it, there may be no point in reading the titles aloud. What you want here is discussion, explanation, and questions. There is no need for hurry. In fact, you may want to devote the rest of the period to just a few scenes. One advantage of the projected still picture, as you know, is that you can leave the pictures on the screen just as long as necessary to accomplish your purpose (Fig. 12.9).

"Then there is also the possibility that you are using the filmstrip for a quick review, to 'clinch' ideas which have been developed. It might be a good idea to read the titles again. You are the best judge of that. But if so, why not let some of your students do the reading? You can tell something about how well they understand by how they read the captions. . . . And besides, unless you're quite different from most of us, you've probably talked too much in your class today anyway."

THE FOLLOW-UP

Evaluation

After the filmstrip has been used, the instructor may wish to evaluate the results. If so, a brief written or oral test can be given or, better still, he can call for a practical application. Suppose, for example, that the filmstrip dealt with how to read a micrometer. The real test not only of the filmstrip but of the total job of teaching is how well each pupil can read a micrometer.

Evaluation becomes more complicated when the purposes of the lesson go beyond skills and factual information to desirable habits, attitudes, and ideals. The follow-up discussion will provide the teacher with opportunities to observe reactions and new points of view, and to answer questions which suggest further activities. Such observations enable the sensitive instructor to assess subjectively whether progress is being made in desired directions.

Application

Aside from evaluation, the follow-up serves the essential functions of applying newly acquired knowledge and interests and relating them to former experiences. The learner normally proceeds from observation to

abstraction, generalization, and assimilation. Seeing a filmstrip is only a small part of this process. A variety of further activities should develop from the new interests. Some children will need further study, others will need little encouragement to explore on their own, and all should have an opportunity to make comparisons with similar experiences they have had.

Assimilation

Out of such comparisons, when there are enough of them, conclusions may come. Conclusions based on related experiences lead gradually to generalizations. After seeing a filmstrip about a farm, the youngsters know that there are cows, horses, chickens, and pigs on that farm. After seeing other filmstrips, films, and pictures and after visiting a farm, they should begin to realize that these animals are typical of many farms. This is a generalization. Later experience will refine this generalization as the students learn to identify different breeds and types of animals according to kinds of farms and regions of the country.

Similarly the concept "horse" develops from one particular animal in one particular picture through a whole series of related learning experiences until the pupil realizes that horses may be of many sizes, shapes, and colors and still be horses. From then on, this generalization, simple though it is, provides the foundation on which all his further learning about horses will be built. Educationally we say that he has *assimilated* this knowledge.

TRANSPARENT SLIDES

CHARACTERISTICS OF SLIDES

Slides and filmstrips are essentially similar, with one major exception, namely, that slides can be shown individually in any desired order. Characteristics common to both include the following:

1. Slides and filmstrips are still picture media; they are of great value in visual teaching situations when motion is of little or no importance for comprehension.
2. They are inherently suited to the convenient presentation of a great variety of visual materials such as pictures, cartoons, charts, graphs, diagrams, maps, and tables. Virtually anything that can be photographed can be put on a slide.

Fig. 12.13. What advantages of the 3¼" x 4" overhead slide projector are suggested in this scene?

3. Both have the attention-focusing power of any projected image.
4. They are particularly well suited for color as well as black-and-white projection.
5. Both can be made in school, though slides are much more easily prepared than filmstrips.
6. They are easy to project (Fig. 12.13).
7. Both require only a slight darkening of the room.
8. They are inexpensive.
9. They cover a wide range of subjects and grade levels.

Most of these characteristics have already been discussed in connection with filmstrips and flat pictures. So far as the image on the screen is concerned, there is very little difference between filmstrips and slides. However, the slide has certain advantages and limitations of its own.

Physical Characteristics

A slide is an individually mounted transparent picture or image which is projected by passing a strong light through it. Slides are commonly

Opposite page: Good color slides have aesthetic appeal and offer practical learning advantages. What beneficial aspects does color add to these handmade and commercially prepared slides?




either 2″ x 2″ or 3¼″ x 4″ in overall size. The transparency on a 2″ x 2″ slide is identical in size to a double-frame filmstrip. The transparency on a 3″ x 4″ slide is approximately 2¾″ x 3″ in size.

A 3¼″ x 4″ slide is usually mounted between pieces of glass; a 2″ x 2″ slide may be mounted on a piece of cardboard or between glass. A roll of 35 mm. color film that has been developed is normally processed in 2″ x 2″ slides in cardboard mountings called "Readymounts." This mounting takes up little storage space but provides limited protection against fingerprints or other damage to the surface. The 3¼″ x 4″ glass slide provides good protection but is considerably heavier and bulkier.

INSTRUCTIONAL ADVANTAGES

The standard 3¼″ x 4″ slide has long been a valuable teaching tool. It has two chief advantages over the smaller 2″ x 2″ slides. Since the surface of the slide is nearly 5½ times as large,[9] larger and more detailed images can be projected without loss of definition through diffusion. Reproductions of large maps, complicated charts and diagrams, tables, and other material in which printing and fine detail are important can be presented more effectively on the larger slides.

A second advantage of this size is that slides can be handmade (see Fig. 12.14). Many interesting and worth-while learning experiences are possible in making and using handmade slides. They can be made rather easily on etched glass, translucent plastic, cellophane, or clear glass, to name a few of the more common materials. Brooks summarizes the values and uses of handmade slides as follows:

> Handmade lantern slides are useful as teaching aids, and in the hands of a skillful teacher they become effective tools. Pupils can use the slides for reports, for summaries, and for enriching projects through pictorial means. They can be used for presenting or previewing new material, supplementing and enriching material already in use, motivating interest, serving as a background for discussion, testing, reviewing, and summarizing. Materials which are not available or easily accessible for projection from other sources can be transferred to the slide.[10]

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[9] The projected area of a 3¼″ x 4″ slide is 6.75 square inches, that of a 2″ x 2″ slide (double-frame) is 1.23 square inches.

[10] Mary Esther Brooks, "Lantern Slides and How to Make Them," *See and Hear*, April, 1946, pp. 65–66.

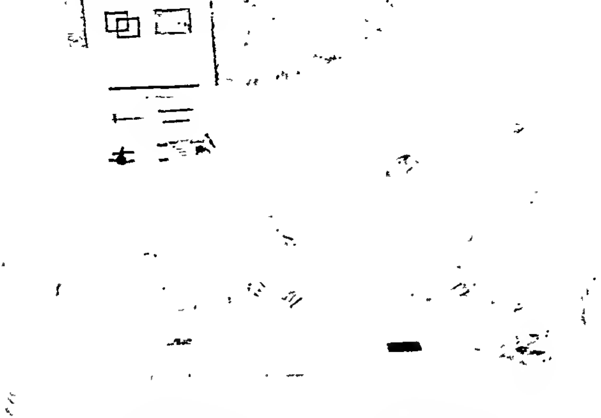


Fig. 12.14. Handmade slides in the 3¼" x 4" size are not difficult to make and they provide useful learning and teaching opportunities.

Convenience of use, quality, low cost, and ease of procuring are among the principal reasons for the great popularity of 2" x 2" slides. The convenience of handling and storing small, light-weight slides is apparent. Furthermore, these slides can frequently be projected in the same machine tbat is used for filmstrips.

The 2" x 2" photographic slides made commercially are of excellent quality, satisfactory for classroom or auditorium use. Commercially produced slides of this size are also available on a great variety of subjects such as art, bird study, foreign and domestic geography, history, literature, health conservation, home economics, meteorology, and zoölogy. Typical sources are listed on pages 544–546. Color slides have no "grain" and hence can be blown up to considerable size without loss of satisfactory definition.[11]

One of the marked advantages of the 2" x 2" slide is the fact that the

[11] An important advantage of both filmstrips and 2" x 2" slides is the fact that excellent color quality is possible at low cost. The educational nature and the selection considerations concerned with color are the same as those discussed in connection with flat pictures (chap. 4), display boards (chap. 6), and 16 mm. sound motion pictures (chap. 13).

instructor can make his own slides with a 35 mm. or a Polaroid camera. With Polaroid transparency film a slide can be made in a few minutes. He can take pictures of field trips, laboratory experiments, exhibits, and many other subjects. He can likewise supply his own illustrations, via slides, for almost any subject or topic which lends itself to photographic treatment.

PROJECTORS FOR 3¼" X 4" SLIDES

Projectors for 3¼" x 4" slides are of two principal types—the familiar horizontal type (Fig. 12.15) and the overhead type (Fig. 12.16). Each contains a cooling fan and will take lamps of 500, 750, or 1000 watts.

The horizontal or standard 3¼" x 4" projector is operated from the rear of the room. The overhead projector can be operated by the instructor from the front of the room as he faces the class, and he can point out on the *slide itself* any items to which he wishes to direct attention.

Fig. 12.15. Projection of 3¼" x 4" slides from the rear of the room requires a projector of this type.

USING 3¼" X 4" SLIDES EFFECTIVELY

The principles discussed in connection with using filmstrips and slides effectively—selection, preview, preparation of the class, presentation, and follow-up—apply equally to 3¼" x 4" slides. In fact, with minor variations, they apply to the effective utilization of *any* kind of audio-visual material.

The experienced teacher recognizes that there is *no one best way* of using audio-visual materials. The procedure employed in a particular instance depends upon the specific nature of the learning situation, the immediate purposes for which the materials are being used, and the context into which they are fitted. As with other instructional materials of any type, the keynote of good use is flexibility—*always in terms, however, of the pupil, his needs, and how he learns.*

Thus, when using only one or two slides, it is unnecessary for the instructor to follow the fixed routine of preparation, testing, and follow-up. To do so would probably hinder the learners more than it would help them, since the elements of keen interest and pointed observation are already present. Furthermore, the pupils' reaction to the slide may in itself be adequate evidence that they have grasped the point. In this case the instructor knows that his purpose has been achieved, and the lesson can continue.

Fig. 12.16 Some projectors are made exclusively for 2" x 2" slides. What advantages can you see for this 1000-watt projector with a 7½" lens?

OTHER TYPES OF STILL PROJECTION

While filmstrips and slides are valuable media of instruction, other types of projection should not be overlooked, because each has equally important instructional advantages. Among these valuable teaching devices for still projection are the opaque projector, the overhead transparency projector, the microprojector, and the stereoprojector.

THE OPAQUE PROJECTOR

Potentially, one of the most useful types of still projection for instructional purposes is opaque projection. It permits nontransparent materials such as flat pictures, book illustrations, tables, drawings, photographs, pupils' work, and even certain specimens and objects to be shown on a screen for group observation.

The instructor with access to an opaque projector has available an almost unlimited amount of illustrative material at little or no cost. Furthermore, much of this material can be used just as it is, for a minimum of mounting or other preparation is required. A theme, a mathematics paper, a sheet of typing, a page or diagram in a book, a picture in a maga-

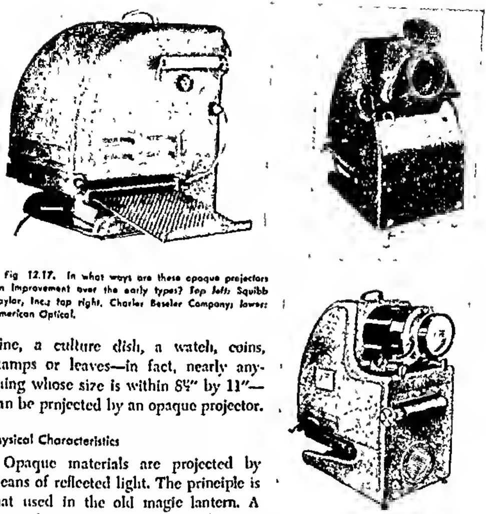


Fig. 12.17. In what ways are these opaque projectors an improvement over the early types? Top left: Squibb Taylor, Inc.; top right, Charles Beseler Company; lower: American Optical.

zine, a culture dish, a watch, coins, stamps or leaves—in fact, nearly anything whose size is within 8½" by 11"—can be projected by an opaque projector.

Physical Characteristics

Opaque materials are projected by means of reflected light. The principle is that used in the old magic lantern. A strong light from the projector lamp is thrown on a picture, and this picture is reflected by a tilted mirror through a lens and onto a screen (Fig. 12.18). The screen image is normally less brilliant than in the case of a slide or other transparency where the light passes directly through the picture. Highly satisfactory images can nevertheless be obtained if the room is reasonably well darkened. The lighting efficiency of the newer opaque projectors has been improved to the point where effective projection is possible in only moderately darkened rooms.

These improved projectors have a 1000-watt lamp, an opening large enough to accommodate 8½" x 11" materials, and an efficient motor-

driven cooling system. Down-draft ventilation holds loose or unmounted material in place without fluttering or loss of focus. A loose postage stamp, for example, can be projected without difficulty with this type of projector. When projecting a page in a book, a piece of window glass or heat-resistant glass will hold the page flat so that all parts of it can be focused sharply.

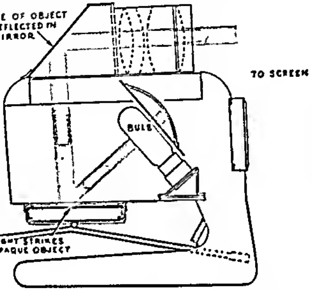


Fig. 12.18. From this diagram can you explain how the opaque projector works?

Advantages and Limitations

The principal and unique advantage of opaque projection in instruction is the great mass of readily available and cost-free materials which can be projected. Much valuable material such as pupils' written work and useful illustrations, diagrams, and tables from magazines and reference books can be projected as it is (Fig. 12.19). Further, the instructor can change the sequence of these materials at will or leave them on the screen as long as he desires.

Another unique value of opaque projection is the convenience with which illustrative material can be enlarged and transferred to a chalkboard or chart. A small news map, for example, can be projected on a chalkboard in any desired size and quickly traced for a current events discussion.

In addition, opaque projection has the attention-focusing advantage that any projected image has. Even when other methods of presentation such as charts or bulletin boards are used, the projected image creates added effectiveness by the enlargement it makes possible, and the fact that it focuses the attention of the entire group. Finally, opaque projection provides opportunity for variety and change of pace in instructional procedures from time to time.

Reflected light is naturally less brilliant than direct light of the same initial intensity. Thus it is that the opaque projector normally requires a better-darkened room than most other projectors. Nevertheless, the newer opaque projectors do a remarkable job of illumination. In consequence,

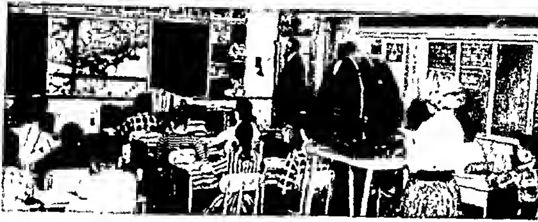


Fig. 12.19. What kind of lens is necessary when an opaque projector is used in the rear of the room?

this type of projector holds real promise of achieving the prominent role in instruction that it so richly deserves.

THE OVERHEAD TRANSPARENCY PROJECTOR

One of the most significant newer developments is the overhead transparency projector (Fig. 12.20). Similar in principle to the overhead slide projector (see Fig. 12.18), it has a variety of highly practical applications in the classroom, in industrial training, and in presentations of various types by speakers.

Physical Characteristics

The overhead transparency projector transmits a strong beam of light through a transparency and onto a screen behind the instructor at the front of the room, facing his class. From his position beside the projector he can point to, write, or draw on the transparency and the material is projected on the screen as he does so. In addition, he can build up his material one step at a time by means of overlays. *This is the one type of projector with which the valuable overlay technique can be used.*

The brilliant light of the projector makes its use effective even where little darkening of the room is possible. Light is reflected through a rather remarkable large plastic lens which directs the light through the transparency into a second reflector above, and on out to the screen. Operation is very simple; little more is involved than placing the transparency on the projection stage. Focusing is done by raising the upper reflector unit by means of a turning knob. Once

a particular location, the projector seldom needs to be refocused.

The projection area ranges from 3" x 3" to 10" x 10" in the several models available. The transparencies are plastic, carbon, cellophane, or acetate sheets. Tracing, drawing, writing, and photographic reproductions made on these sheets can be projected clearly on the screen. Typewritten material can also be projected.

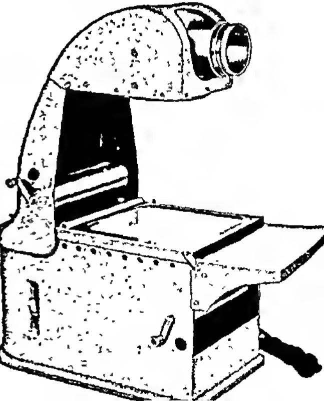
Advantages and Limitations

Some of the advantages of the overhead transparency projector have already been suggested. Operated as it is from the front of the room, the teacher or speaker is able to face the group and thus maintain direct communication at all times (Fig. 12.20). He can write or indicate points of importance on the transparency with a China marking pencil. Such marks are easily removed with cleansing tissue.

The materials usable on this projector are virtually unlimited. Anything that can be drawn or photographed on a transparency can be projected. The teacher can make many of his own transparencies without needing a darkroom or other unusual paraphernalia.[12] A few transparencies are available commercially, and it is also possible to have them made up at low cost in certain university audio-visual centers.

A feature which appeals to most teachers is the cellophane roll that is built into the projector. A 100-foot roll of cellophane provides space for over 100 panels, any number of which can be prepared ahead of time and rolled into position by turning a small crank. Diagrams, lesson assignments, tests, and similar material can be effectively presented in this manner at a minimum of time and effort.

An elementary teacher observing a demonstration of an over-



[12] *The Overhead Projector* (Sound, B&W, 18 min., University of Iowa) gives many examples of how to use this projector to advantage and how to make your own transparencies.

head transparency projector pointed out another advantage in the comment: "My blackboards are always so filled up and such a mess before the day is over! With a projector like this I could avoid a lot of that messy appearance and my pupils could see better besides."

Another feature of this projector is the possibilities it provides for using overlays or "build-ups." Successive layers of transparencies in black and white, color, or both can show cumulative stages of development, sequences, and sectional views. Lettering, mechanical drawings, the several stages in completing a map or assembling a machine, and cumulative additions to a chart or graph are typi-

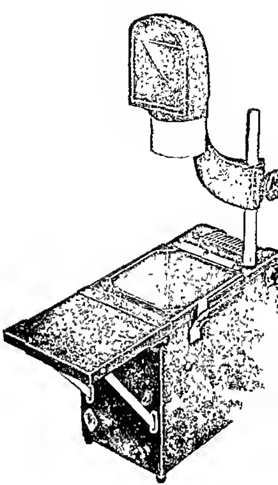


Fig. 12.20. The overhead transparency projector is one of the newer developments in still projection. What are the teaching advantages of this junior (opposite left) and full-size model (upper right)?

Fig. 12.21. For what purpose is a microprojector superior to individual microscopes?

cal of the many possible uses of transparent overlays in the classroom.

The principal shortcoming of the overhead transparency projector is the somewhat limited amount of prepared materials currently available. However, this situation will be remedied quickly once schools begin to recognize the unusual potentialities of the transparency in teaching and the feasibility of having them prepared locally.

THE MICROPROJECTOR

One of the more specialized types of projection equipment is the microprojector (Figs. 12.21 and 12.22). As its name indicates, this projector is designed to project microscope slides so that an entire class may see what would be visible to only one pupil at a time if seen under a microscope. Furthermore, both wet and dry slides may be projected.

Among the particular advantages cited for the microprojector are the following: (1) It minimizes the need for expensive microscopes for each student, (2) it presents a greatly enlarged picture of the object on the slide, and (3) it assures the instructor that his students are seeing precisely what he wants them to see.

Numerous phenomena suited for presentation on microscope slides can be shown with marked effectiveness on a microprojector. Sargent[13] lists such uses as the following:

1. Illustration of stresses and strains on fibers, filaments, and surfaces.
2. Physical examination of wood, cotton, silk, rayon, linen, and other textile fibers.
3. Gross projection of prepared slides showing fingerprints or other semitransparent print materials such as blood smears.
4. Visualization of interference patterns of light, and optical principles of refracted light.
5. Gross examination of properties of crystals and other common compounds such as minerals, food, rubber, and petroleum by means of white and polarized light.
6. Projection of crystal growth in solutions such as ammonium chloride, sodium nitrate, copper sulfate, potassium dichromate, and potassium chlorate. Removal of the projector cooling cell causes melting. Replacement of the cell results in crystallization which can be shown without changing the field of projection.
7. Projection of one-celled animals and plants in solution, cell division, plant and animal tissues, bacteria, mold spores, and the like.

Fig. 12.22. A streamlined version of a microprojector.

Virtually all prepared microscope slides now available can be projected with the microprojector. However, the light beam must be cooled sufficiently to prevent damaging the material on the slide.

[13] Theodore Sargent, "Using the Microprojector in Physics and Chemistry," in Harry C. McKown and Alvin B. Roberts, *Audio-Visual Aids to Instruction*, McGraw-Hill, New York, rev. ed., 1949, pp. 512–513.

THE STEREOPROJECTOR

Increasing attention is being given to the possibility of projecting stereographic views for class use. Transparencies for this purpose are prepared in pairs from photographs taken with a stereographic camera (Fig. 12.23). This camera takes two pictures simultaneously with lenses a few inches apart. Each picture, therefore, is taken from a slightly different angle; and when both pictures are seen together in a stereoscope a highly realistic and vivid three-dimensional effect is obtained.

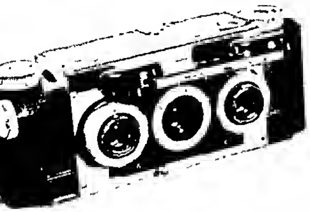


Fig. 12.23. Cameras of this type take two pictures simultaneously. When these are viewed in a stereoscope or projected on a screen what effect is obtained?

The familiar stereoscope permits only one person at a time to see a pair of pictures. The left eye sees one picture and the right eye the other; the brain combines them into one three-dimensional image.

When a pair of stereographic transparencies is thrown on a screen with a projector, both pictures are seen by both eyes and the result is a confused agglomeration of vaguely defined images. A pair of specially designed glasses worn by each observer gives a striking three-dimensional image which stands out sharply and vividly. A field of flowers may look so real to a person wearing these glasses that he has to resist the temptation to pick one.

Certain technical problems remain to be solved before stereographic projection can be entirely satisfactory. There is a tendency, for example, toward overexaggeration of depth in close-up views, and a similar aberration around the edges of a picture. The stem of a tulip near the edge may seem to be considerably longer than stems near the center of the picture, though actually all are approximately alike.

The special screen and glasses required are additional drawbacks to stereographic projection for most instructional purposes. However, for certain specialized purposes such as surgical, art, and engineering traioing, the values of three-dimensional projection are important enough to merit its use.

SUMMARY

Still projection makes possible group examination of individual pictures and illustrative materials for as long as the teaching purpose requires. It also has the attention-focusing power of any projected image. Together these advantages make for a powerful and effective teaching medium when motion is not essential to comprehension.

There are various forms of still projection such as filmstrips, 2" x 2" and 3¼" x 4" slides, opaque projection, overhead transparency projection, microprojection, and stereoprojection. Each has unique advantages and uses in instruction.

As with other audio-visual materials, the effectiveness of still projection media depends to a large extent on how they are used. In general, the familiar principles of all good teaching apply: preview and selection of the most appropriate materials; class preparation, including motivation and direction on what to look for; good projection conditions; and follow-up, including testing, application, and reteaching as needed. Good procedure is flexible rather than rigid; it adapts itself to the requirements of the individual learning situation. The teacher's good judgment should determine when and how the principles of effective use can best be applied in a learning situation to achieve a well-integrated result.

Suggested Activities

1. As a committee or individual project, have units of work in a given subject and grade area analyzed as to (a) where still projection materials could make significant contributions to learning, and (b) what specific materials could do the job.
2. Survey the still projection equipment and facilities of your school and prepare a report for your principal or superintendent that includes:
   a. Present status.
   b. Recommended additions and changes for next year.
   c. Recommended changes and additions for the next five years. Draw up supporting statements for your recommendations.
3. As a building director of audio-visual instruction you have been concerned for several years about the tendency of most of your teachers to use motion-picture films rather than available still projection materials, regardless of the latter's superiority in many teaching situations. You get permission from

your principal to call a faculty meeting for the purpose of "educating" your teachers regarding the potentialities of one or two types of still projection. Prepare a demonstration for your audio-visual class showing how you might do this.

4. Divide the class into committees and have each one prepare a demonstration showing interesting applications of one of the following: (a) the opaque projector, (b) handmade slides, (c) the filmstrip projector, (d) 2″ x 2″ slides, (e) 3¼″ x 4″ slides, (f) the microprojector, and (g) the overhead transparency projector.
5. In order to give class members information about various makes of still projection equipment, have an interested group write for literature in sufficient quantities so that each member can have individual copies. If feasible, arrange with your local dealer for demonstrations of several makes of equipment.

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Filmstrips

Cuthbert's Last Stand, 40 frames, B&W, Sarra, Inc.
Enriching the Curriculum with Filmstrips, 60 frames, B&W, Society for Visual Education, Inc.
Filmstrip Preparation, 78 frames, B&W, United World Films.
Introducing Filmstrips, 29 frames, B&W, National Film Board of Canada.
Simplified Filmstrip Production, 40 frames, B&W, Ohio State University.
Slidefilm in Teaching, 46 frames, B&W, Young America Films.
Teachers Consider Filmstrips, 27 frames, Color, Eye-Gate House.
Teaching with a Filmstrip, 50 frames, B&W, Society for Visual Education, Inc.

Sound Films

Handmade Materials for Projection, Color, 21 min., Indiana University.
High Contrast Photography, Color, 20 min., Indiana University.
How to Make Handmade Lantern Slides, Color, 22 min., Indiana University.
Overhead Projector, B&W, 16 min., Iowa State University.
The Opaque Projector—Its Purpose and Use, B&W, 6 min., Iowa State University.

13.

The 16 mm. Sound

THE TEACHER HAS A DEMANDING ROLE. IN THE SOCIAL STUDIES HE MUST help learners who, although they live in the school locality, must know about the farthest reaches of the earth and the people and cultures of the world.

The teacher of science confronts the task of helping pupils understand the processes of biology or all manner of natural phenomena, some too small for the human eye to observe, some whose actual observation is impractical because they develop or move or grow at too fast or too slow a rate. Similarly, the history teacher today must make understandable to his pupils world-wide events of the past and the present.

For such tasks, the 16 mm. sound motion-picture teaching film is without doubt a dramatic, interesting, and psychologically useful supplement to classroom procedures.

Motion-picture cameras of today enable any place or event in the accessible world to be photographed, and voices and environmental sounds to be recorded. Teachers and curriculum experts are more and more being called upon for suggestions for subjects to be filmed. The resulting carefully made film can then be used in any classroom at exactly the time the teacher wishes his students to see it.

Of the many manifestations of twentieth-century genius, the 16 mm. sound motion-picture film is one of the greatest. The motion-picture camera can record what it "sees." The sound recorder can record what it "hears." Thus two of man's primary avenues of awareness, seeing and hearing, can be appealed to simultaneously. The sound motion-picture film is an almost living document of things and events which take place

earner be provided with as he attempts to
of the Declaration of Independence?

PHYSICAL DESCRIPTION

Any description of a sound motion picture must be approached by describing (1) the photographics and (2) the sound electronics of a device that in reality is many inventions.

A motion picture is a series of still pictures taken in rapid succession, developed, and finally projected again as a series of still pictures but under such conditions as to give the viewer an illusion of motion. The addition of a coordinated sound signal or track results in a sound motion picture.

This needs to be elaborated. It can be done by describing how a portion of a single scene from the motion picture *Daniel Boone* (Sound, B&W, 16 min., EBF) was made. The section of the film which will be described appears in the shooting script as follows:

Sequence B—NORTH CAROLINA

10. *Field, forest and sky* (3–80)
    NARRATOR: Here the land was cheap and bountiful, and the symbol of a man's ownership was a
11. *Tree being notched* (3–83)
    gash in a tree . . . The Tomahaute Claim!
12. *Daniel Boone shooting* (7–90)

After a script has been written, it is usually reviewed and checked by a subject-matter expert. In this case both a recognized historian and a museum curator checked the ideas and descriptions in the script.

Next the action called for in the script was rehearsed. Studio light experts arranged the lights so as to focus attention on the smoldering wick that ignited the exposed powder when Boone wanted to discharge the long rifle at a target.

THE PICTURE TRACK

The motion-picture camera, actually a device for recording a series of still pictures at 24 exposures per second, was then set into operation. The result is shown in Fig. 13.1. Note how only slight changes in Boone's position appear from one still picture, or motion-picture "frame," to the next. This happens because the motion-picture camera rapidly "snaps" 24 still pictures or frames per second (16 frames for silent motion pictures). When these "still frames" are projected or flashed in sequence on a screen, the impression of life and motion is apparent to the viewer.

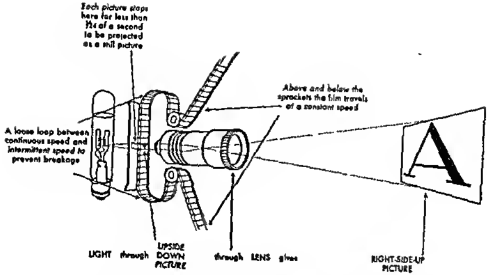


Fig 13.2. How the impression of motion is created by the projector.

THE SOUND TRACK

The discovery of the photoelectric cell made sound recording on film possible. The first sound pictures represented a combination of sound recorded on phonograph disks that were later synchronized with the film. In 1928 the recording and reproduction of sound on film became a reality.[1]

Sound is photographed on photographic film. The two photographic negatives, picture and sound, are then printed on one positive by ordinary photographic processes. The resulting film, when run through a modern sound projector, gives rise to the visual-aural impression that we call a sound motion picture.

When the sound for a motion-picture film is photographed, the sound waves are picked up by a microphone which converts the varying sound waves into similarly varying electric current. These current variations control a light valve. The light valve used in most sound recording is composed of two metallic ribbons which move apart or together in response to the variations in current. A constant beam of light is focused on this valve. The opening and closing of the valve allows similar light variations to be recorded as light and dark areas on photographic film.

[1] See *Sound Recording and Reproduction* (Sound, B&W, 10 min., EBF) for a detailed explanation.

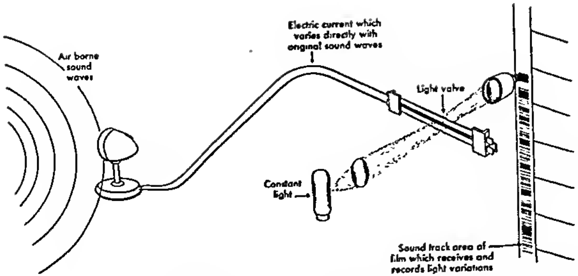


Fig. 13.3. How sound is recorded on film. Sound is changed first into electric impulses and then into variations in light that are recorded on the sound track. To understand how sound is reproduced later, see Fig. 13.5.

The sound-image film moves at a speed of 24 frames per second, the same speed at which the photographic film moves. The process is summarized in Fig. 13.3. The sound motion-picture film for the sequence, rifle action—Daniel Boone, is shown in Fig. 13.4.

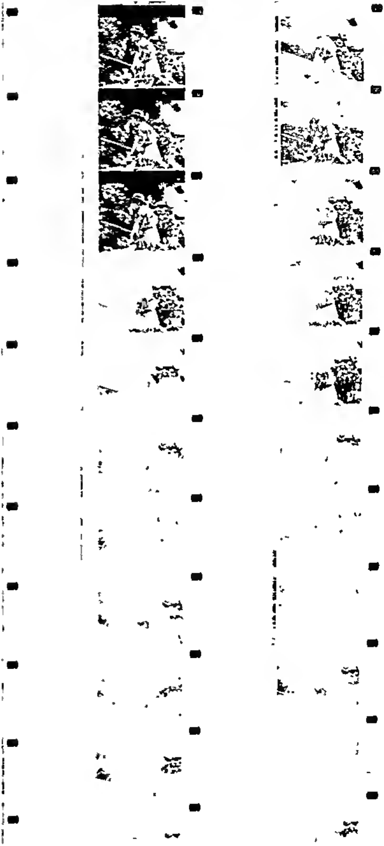
The means by which sound is reproduced from a sound motion-picture film is practically the reverse of the way it is recorded (see Fig. 13.5). As the film moves through the sound motion-picture projector, a light of constant intensity is directed through the sound track on the film. The light passes through the track in lesser or greater amounts depending on the light variations in the sound track.

This residual variable light is directed toward a photoelectric cell which converts the variable intensities into similarly varying electric currents. These in turn set up corresponding movements in the loudspeaker diaphragm. Thus, the original sounds recorded when the sound track of the film was made are once again reproduced.

THE SOUND MOTION-PICTURE PROJECTOR

The mechanism used to project sound motion-picture films is called a sound motion-picture projector. Although several types and makes of sound motion-picture projectors are available for school use, there have

Fig. 13.4. *Left:* The sound record is printed on one film. *Center:* The picture record is printed on another film. *Right:* The sound and picture records are finally printed on one film to produce the sound motion-picture film. Note the relationship of the sound track to the frames.



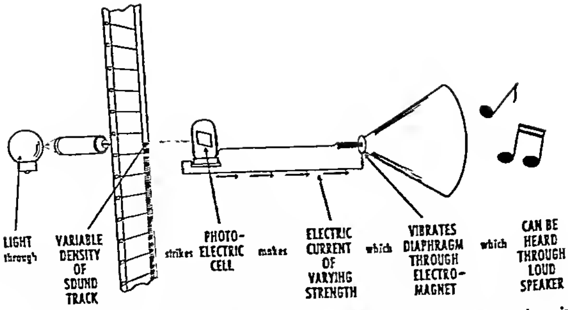


Fig. 13.5. How the sound projector reproduces sound. Note that this reverses the process shown in Fig. 13.3.

been developed during recent years several projectors with characteristics that specifically adapt them for use in the classroom. Such projectors are, first of all, light in weight for easy carrying, or they may be mounted on rolling projection stands so that they can be moved easily from classroom to classroom. Good sound systems and light sources in projectors allow motion pictures to be projected effectively in any classroom in which the light can be controlled by blinds, shades, or drapes.

Basically, *all* sound motion-picture projectors are a combination of three mechanical devices, each of which performs one of the functions which together constitute the modern projector:

1. A mechanism for passing light through a series of rapidly changed still photographs recorded on film. To do this, the projector must move the film in front of a strong light source, and it must mechanically start and stop this film 24 times per second in front of this light.
2. A mechanism for moving the sound-track portion of the film between a constant light source and a photoelectric cell in order to reproduce sound. The film must move at a constant speed so as to produce lifelike sound.
3. An amplification unit much like a small radio set which will amplify a tiny sound impulse to a degree of loudness that allows the listener to hear lifelike voices and sound.

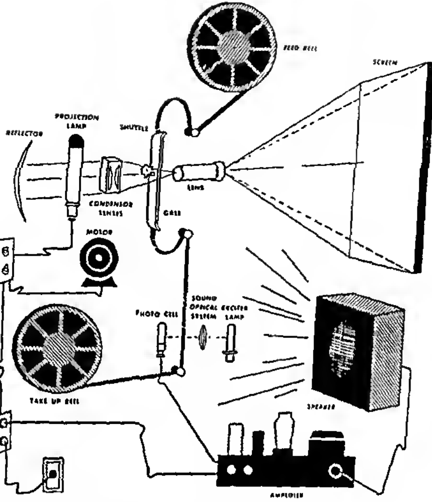


Fig. 13.6. This stylized diagram shows the three basic mechanical devices present in any of the several 16 mm. sound motion picture projectors now used.

These three mechanical functions are present in all classroom sound motion-picture projectors in use today. A composite projector, a stylized version of any or all of the projectors currently in use, is shown in Fig. 13.6.

The several manufacturers of sound projectors emphasize various characteristics and elements of design. Differences in price exist because of such factors as quality of workmanship, sound output, amount of light that falls on the screen, quality of the lens system, sturdiness and design of the carrying case. Several of the current models of 16 mm. sound

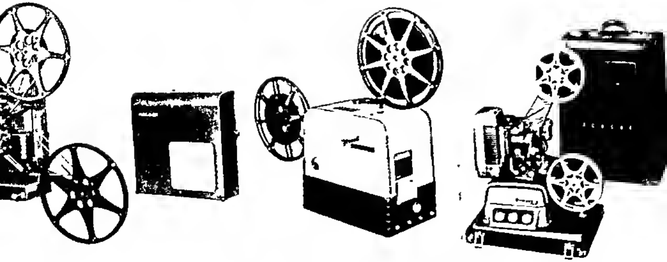


Fig. 13.7. Here are several of the 16 mm. sound motion-picture projectors that are available today. Left to right: Radio Corporation of America's RCA 400, Bell & Howell, Revere, Ampro, Victor Animatograph, and Eastman.

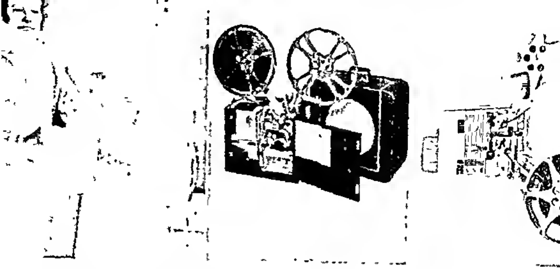
motion-picture projectors for classroom use are shown in Fig. 13.7.

Teachers and administrators who are selecting a projector should ask reputable dealers to demonstrate the various models in the same kind of conditions that apply in the classroom. Although demonstrations are desirable, perhaps even more important is the dealer's reputation and the performance and service guarantee given with the equipment. Service is particularly important, for unless equipment is kept in the proper condition, it may not be functioning when needed.

Though they differ in price, design, and efficiency, most modern sound motion-picture projectors are basically similar in operation. Hence, anyone who understands that the film must be threaded in the machine so that (1) the stop-start action of the film can take place and a visual image be produced, and (2) the film will move smoothly and continuously between the lamp and the photoelectric cell, thus enabling clearly audible sound to be reproduced, should be able, regardless of inexperience, to use any modern projector.[2]

Teachers may learn to use projectors in various ways. In some cases the school's audio-visual coördinator will himself instruct them. Because on most modern sound projectors film "threading" paths are clearly marked by raised metal or painted guidelines, most teachers will find

[2] For diagrammatic instructions in 16 mm. sound projection, see Amo De Bernardis, *The Audio-Visual Projectionist's Handbook*, Audio-Visual Publishers, Chicago, 1948, and Phillip Mannino, *ABC's of Visual Aids and Projectionist's Manual*, State College, Pa., 1946.



that after 10 or 20 minutes of practice they can thread the projector and set it in motion properly. Several state film libraries supply 100-foot reels of expendable film for practice purposes at extremely low cost.

By studying the operation manual, by using practice film, by taking assurance from the fact that women operate complicated kitchen and laundry equipment without difficulty, the teacher—particularly women teachers—should have little trouble in learning to use this newest supplement to good teaching.

THE SOUND MOTION-PICTURE FILM IN INSTRUCTION

We now discuss the film, not as a physical and mechanical object but as a teaching-learning material for instructional use.

The instructional sound motion-picture film is a means of recording the social and natural environment of man so that it may be later reproduced to create realistic, lifelike learning situations which closely simulate the original.

The effective teaching film allows the learner a maximum of personal identification with the situation recorded in sound and motion. The experience it re-creates may be only slightly removed from actual firsthand observation or participation. Such a film is a means of re-creating the environments of the world for *conscious learning* by the pupil.

DIRECT PHOTOGRAPHY

The recording "eye" of the camera and the "ear" of the microphone may be used in many ways in making teaching films. When the camera

records things as you and I ordinarily see and hear them, a direct photographic sound record is the result. Many motion-picture films useful in teaching social studies, science, and language arts are direct photo-sound records. Such motion-picture teaching films open up major avenues of information in areas where for generations the means of information has been the textbook, the spoken word, the diagram, the picture.

The teacher who attempts to help children learn about faraway places soon realizes that a child who has spent his entire life in the metropolitan area of Philadelphia or the semiarid valleys of the Palomar Range in southern California has very little background experience to apply in studying a distant region unlike his own community. His experience will be of little help when he tries to interpret words which describe the homes, the witch doctors, the crafts, and the food-getting habits of the Mangbetu of the Congo basin.

Any solution of such problems was for the most part beyond reach until the advent of the 16 mm. sound motion-picture film. Films which rely on direct photography—films which vis-

Fig. 13.8. In what ways do such direct photography teaching films as *The Rise of Nations in Europe*, *The Honeybee*, *The Middle East*, and *The Bill of Rights of the United States* overcome old barriers to learning—distance, time, and the limitations of the human eye?

ually record places, things, costumes, speech, the sounds of animals—can make dramatic contributions to the learning process. Such films present real and understandable impressions that provide readiness opportunities for text and source reading.

The value of the direct photography sound motion-picture film is dramatically revealed in the field of history. Twenty-five years ago, students of American history examined wall charts containing crosses, dotted lines, and other symbols, and they read about battles, treks, and hardships. Their textbook had portraits of historic figures, black-and-white steel engravings of Old World architecture, and a woodcut or two of sailing vessels. The pupils listened to descriptions of historical events given by their teacher, who had learned about these incidents largely through the same medium—books. Neither teacher nor pupil had ever "witnessed" any of these episodes.

The 16 mm. sound motion-picture film makes it possible to reconstruct the circumstances of history. Homes, castles, farms can be rebuilt; museums can supply costumes, utensils, and other authentic paraphernalia. Through research, the patterns of speech and pronunciation can be reconstructed. Finally, the carefully planned reënactment of historical events that have present-day social significance can be photographed by skillful cameramen. Thus we can relive history—land with the Pilgrims at Naumkeag, spend the first winter in Salem, Massachusetts (*Early Settlers of New England*, Sound, B&W, 10 min., EBF), go down the Ohio River on a flatboat (*Flatboatmen of the Frontier*, Sound, B&W, 10 min., EBF), or ride across the Southwest with the pony express (*Pony Express*, B&W, 10 min., Barr).

The *Great Americans* series[a] re-creates the lives of Benjamin Franklin, Andrew Jackson, Alexander Hamilton, Daniel Webster, Susan B. Anthony, and a host of other Americans, against a background embodying the social and political conditions of the period in which they lived. Recently released are films oriented around high points of our history—the Declaration of Independence, our Constitution, the Emancipation Proclamation, the Bill of Rights, etc. Following such film experiencing, history texts will be read with the greater assurance that the reader is understanding what he is reading.

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[a] *Encyclopædia* Britannica Films, Wilmette, Ill.

CHANGING-SPEED PHOTOGRAPHY

Some things occur too quickly or too slowly to be readily apparent to the human eye or ear. In such cases the camera can be slowed down or speeded up, the resulting film being projected at normal speed.

Fig. 13.9. When action, i.e., the vibration of the vocal folds, is so rapid that the human eye cannot observe it, how can a high-speed camera like this be used to compensate for the situation?

High-speed cameras can be used to explain things which occur too rapidly to be grasped clearly by our eyes. For example, the utricularia, an aquatic plant, closes its leaves in 1/50 of a second to trap its insect victims. High-speed cameras, however, can take pictures of this plant in action, at the rate of 240 or more separate pictures per second. When these pictures are projected at the usual rate —24 frames per second—the action that originally took place in one second (24 frames) will last for 10 seconds as the 240 frames flash across the screen. Now the eye has time to observe and the brain to comprehend how insects trip the delicate mechanism of the plant trap and become hopelessly snared for later digestion.

The reverse of this occurs when a camera records movement that is so slow that little or none of it is apparent to us. In the film *Plant Growth* (Sound, B&W, 10 min., EBF), single still pictures of a growing plant were taken at intervals of several minutes. In this way the plant's development over hours and days was recorded on photographs on which, when they were projected at the rate of 24 per second, months of plant growth were condensed into 10 minutes of viewing time. When the late Glenn Frank, former president of the University of Wisconsin, saw this film, he described the experience as follows:

> Yesterday within the space of ten minutes, I saw a plant grow to full maturity, bear fruit, and die. As a child I often stood with awe before the mystery of plant growth and wondered what it might be like to see the actual processes of growth as I saw my playmates run back and forth across the village lawn. I had to wait forty years to see it, but yesterday, the thing I wondered

about as a child, happened. I saw the processes of growth as clearly and as plainly as this morning I see motors streaming by in the street below my hotel window.

Conan Doyle had not come back to show me marvels in a séance. I was not under the delusive spell of a magician. I was simply watching an educational film on plant growth.

A pea was dropped on the ground. Soon its side burst open and a white sprout, or whatever the experts call it, came peering with manifest curiosity out into the open. The white sprout turned downward and began nosing about for a way to burrow downward in the soil. It nosed about with an appearance of almost animal sense. Soon it began its downward journey into the soil which had been cut away so the camera could catch the downward journey of the root.

Science teachers particularly need changing-speed motion-picture films. The life cycle of a butterfly extends over too much time, some chemical changes occur too rapidly, the process of crystallization is too slow for practical classroom observation. In these situations changing-speed photographic films are valuable supplements to instruction in science, home economics, etc.

Such films as *Plant Traps* (Sound, Color, 10 min., EBF), *Growth of Flowers* (Sound, Color, 10 min., Coronet), *Sensitivity of Plants* (Sound, B&W, 14 min., UFA), *Butterflies* (Sound, B&W, 10 min., EBF), and *Reactions in Plants and Animals* (Sound, B&W, 11 min., EBF) should be previewed and studied in order fully to appreciate the value of changing-speed photography.

PHOTOMICROGRAPHY

The use of the motion-picture camera to photograph anything that can be seen has been mentioned. However, the teacher of science, home economics, or agriculture is often interested in seeing *beyond the limits of human vision.*

One way of seeing things too small for our eyes to observe is to use an enlarging lens or a microscope. Today the camera and the microscope can be combined to record by motion photography things that are too small for us to see. This process is usually called photomicrography or microphotography.

The home economics teacher who wishes to explain to her students the relationship of yeast growth to bread making can show her class a photo-

micrographic record, a motion picture of the growth of a colony of yeasts and molds. A 16 mm. motion picture *Mold and Yeast* (Sound, B&W, 10 min., EBF), and also *Microscopic Plant Life in the Bakeshop* (Silent, B&W, 30 min., American Society of Bakery Engineers) enable every student to see yeasts bud and form the carhon dioxide which "raises bread dough."

Similarly, photomicrography permits the science teacher actually to observe the growth and division of human cells, in *Cell Division* (Silent, B&W, 15 min., Wistar Institute) and *The Cell* (Sound, B&W, 10 min., Coronet). In the science classroom, while viewing *Life in a Drop of Water* (Sound, B&W, 10 min., Coronet), pupil and teacher can see the life cycle of an amoeba and other protozoans unfolded in graphic and understandable sequences of vastly enlarged images.

Children can now watch tiny insects, magnified to two or four feet in height, grow and develop. These processes are no longer a mystery after photomicrographic records, such as *Honeybee* (Sound, B&W, 11 min., EBF), *House Fly* (Sound, B&W, 11 min., EBF), and *Mosquito* (Sound, B&W, 10 min., EBF), are studied.

Teacher and pupils can see beyond the former boundaries of human vision. They can watch the growth and reproduction cycles of organisms too small for the naked eye to observe. Through photomicrography, "pictures" three feet high of microscopic plant and animal life "move and live" on the motion-picture screen.

ANIMATION

A teacher often encounters learning problems that demand information beyond what can be observed in real life. Learners are interested in investigating ideas which do not exist in concrete form. While much of the curriculum is concerned with the physical, concrete aspects of the environment, there are broad fields of information apart from the real and tangible.

If motion and sound are effective in explaining tangible, real things, visualization should be even more effective in explaining theories, ideas, and hypotheses. Animation photograpby serves this latter area of learning.

Animation is the process by which a concept is visualized. It is usually used to visualize a "hard to explain" concept. Abstract ideas can often

be made concrete through analogy. This has been well explained by an educator-animator, in terms of jet propulsion (see Fig. 13.10):

> Where the live-action camera is the counterpart of the physical eye, the animation camera represents the mind's eye. Live-action will reproduce anything that can be seen—animation will produce anything that can be imagined.
>
> Teachers tell us that in the realm of the abstract, if a picture is worth a thousand words, a compelling analogy is worth five thousand. And the imaginative analogy is animation's meat and drink. For example: the principle of jet propulsion derives from Newton's Third Law of Motion, to the effect that "every action produces a reaction which is equal in force and opposite in direction." This abstract principle was visualized in the film in terms of an escaping toy balloon, which as the air escaped through its open vent, drove forward in reaction to the rearward discharge of air. Then an essential sidelight—that this forward motion really resulted from action-and-reaction, and not from the push of the gases on the surrounding air—was visualized by the firing of a pistol through obstacles of varying density (air, water, and a vacuum), wherein the recoil of the pistol was shown diagrammatically to be, in all three cases, exactly the same. Finally, to draw the conclusion visually, on the screen, rather than verbally, in the narration, animation used its peculiar power to tie analogy and actuality together in the same scene by superimposing a continuously firing pistol on the jet outlet of the moving airplane itself. When the sequence was finished, analogy had embedded an abstraction in the concreteness of the viewer's own familiar experience.[4]

The 16 mm. sound films abound with examples of animation. The science teacher who is dealing with aeronautical terminology and techniques can use animated films to explain elementary concepts such as yaw, pitch, and roll; such a film is *Theory of Flight* ([Revised], Sound, B&W, 11 min., EBF). In a more advanced lesson he may have to discuss the principles of the gyrosyn compass; this depends almost entirely on theoretical explanation. Here the film *Gyrosyn Compass* (Sound, B&W, 25 min., Sperry Gyroscope Company) will be helpful.

The home economist who wishes to explain the relationship between photosynthesis and food energy can find an interesting and clear explanation of leaf chemistry in the film *Gift of Green* (Sound, Color, 18 min., Sugar Information, Inc.).

Animation has increased the teaching power of the film many times. The animated sound film can explain anything that exists in man's mind.

[4] Carl Nater, "Animation in Education," *See and Hear*, May, 1947, p. 13.

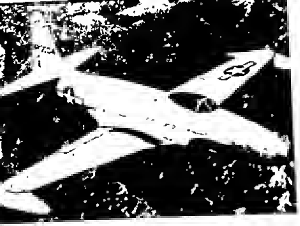
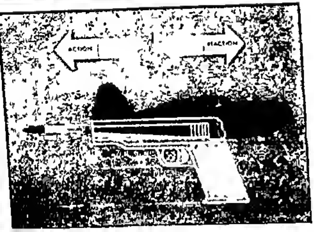


Fig. 13.10. The jet propulsion that powers the plane shown here cannot be explained by photography; animation is necessary. The animator combines analogy with reality. Animation uses pictorial analogy to demonstrate that the reaction to an action is equal in force regardless of environmental influences.



There are few areas of human thought or learning today which are not well and effectively served by visual animation.

Splendid examples of film animation are offered by such films as *Jet Propulsion* (Sound, Color, 15 min., GE), *Fuels and Heat* (Sound, B&W, 11 min., EBF), *Work of Kidneys* (Sound, B&W, 11 min., EBF), *Biography of the Unborn* (Sound, B&W, 20 min., EBF), *Adventures of Junior Raindrop* (Sound, Color, 10 min., USDA).

Previewing such films as the above will prove most helpful in gaining an understanding of animation. Only through seeing and hearing explanations given by sound motion-picture animation can full appreciation of the strength of this photographic medium be gained.

To summarize, many of the physiological limitations of man's ability to observe can be overcome by means of the 16 mm. sound motion-picture film:

1. Things which exist in understandable but inaccessible form can be photographed from life by means of direct photography.

2. Things which are too small to be seen can be made visible by photomicrography.

3. Things which happen too rapidly for normal observation can be slowed down to comprehensible speed, and vice versa.

4. Things which are too abstract, too large, too hidden, or too theoretical for effective comprehension by the average learner can be visualized by animation and portrayed on film.

The 16 mm. sound motion-picture film can bring the entire world into the classrooms of the most remote mountain villages. No idea or phenomenon is too remote, inaccessible, or abstract for graphic and understandable explanation through this medium of communication.

COLOR

When should the teacher use a colored 16 mm. sound or silent motion-picture film in the classroom? This question is often asked by teachers, but it is even more frequently asked by the people who are responsible for buying films and who are thoroughly aware of the wide differential in the price of a film that is released both in color and in black and white.

Colored motion-picture films should be used when the color enables the viewer to gain a more accurate, realistic, and vivid understanding of what is being shown.

Although the above sounds like a simple rule of thumb, it is difficult to remove from consideration of this principle the interest and enthusiasm in color *per se*. The Hollywood slogan, "In gorgeous Technicolor," is not easily dismissed from the minds of a generation of movie-conditioned teachers and young people. However, in assessing the role of color in the selection and use of classroom teaching films, the single most important consideration should be whether it contributes to learning.

In the realm of nature, color and meaning are virtually synonymous. In nature, color has the function of attracting and in other cases of camouflaging or distracting. Hence to understand how color helps camouflage desert animals, such films must be shown in color, not in black and white. Similarly, in describing the coloration of plants, birds, and animals, colored films are equally important. For aesthetic appreciation and accurate understanding of architecture and of the costumes of other social groups, particularly those that are remote in time or distance, color films, not black-and-white films, are necessary.

Although it is said that the average learner can "read" color into black-and-white pictures, this is not usually the case. When situations

are too far removed for his first-hand experiencing of color, he probably will not have the opportunity for enough color experiencing to enable him to "color" the black-and-white pictures.

You can investigate the role and value of color by means of the plates facing these two pages. The first plate shows several black-and-white frames from current sound motion-picture teaching films. Examine these frames carefully and at length, and list mentally or in writing what you see in each one.

Now look at these same frames in color; it was from these that the black-and-white frames were made. Examine the color frames carefully. Check your notes on each black-and-white picture; what additional information and, as important, aesthetic impression do you gain from the color frame? Then answer these questions:

1. What specific additional information was supplied through the color alone?
2. What relationship depended solely on color for meaning?
3. What aesthetic feelings did you have after viewing the color frames which you did not have with the black-and-white frames?

You are now much more realistically prepared to assay the role of color in the sound motion-picture teaching film.

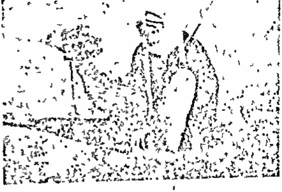
As important as the communication of facts is in the learning situation, do not overlook the role of color as a means of centering attention, inciting interest, and creating sheer aesthetic appreciation. Many educational film producers are convinced that if the economics of film production permitted the production of low-cost colored films, teachers would use only color films.

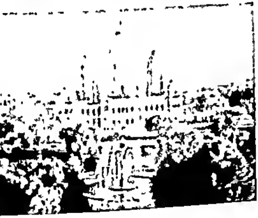
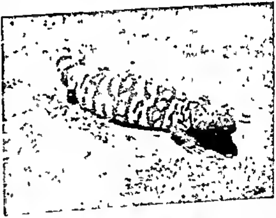
CLASSIFICATION OF 16 MM. SOUND MOTION-PICTURE FILMS[5]

Many classifications of motion-picture films have been made. Because the present discussion is concerned with the school use of sound films, films which are described here will be classified as (1) basic teaching films and (2) supplementary teaching films.

Basic teaching films are usually made specifically for carefully desig-

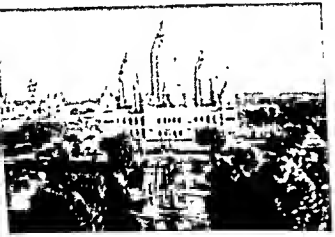
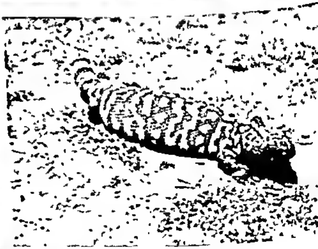
[5] For a comprehensive source list, see pp. 424–428.





nated curriculum areas. These films are planned and produced to improve teaching.

Supplementary teaching films are invariably made for some purpose other than enriching and implementing the school curriculum. Because most films have educational values, untold numbers of those made for extra-school purposes contain information which is of value in regular school learning situations.

Supplementary teaching films originate from many sources. They may be grouped into three classes: (1) documentary films, (2) sponsored films, and (3) entertainment films.

BASIC TEACHING FILMS

The producer of a teaching film is usually a student of school curricula. He is well aware of the values of a film in relation to instructional problems. He believes that when a subject demands visualization, motion, and natural or environmental sounds in order to be understood by the learner, the 16 mm. sound picture can make a contribution to both teacher and learner.

A teaching film may be described in terms of several of its most inherent and valuable characteristics.

1. *It visualizes.*

Much of the material studied in school demands to be examined, manipulated, and seen in order to be understood. The effective teaching film completely and understandably visualizes its subject through good photography. It visualizes also through charts, diagrams, and animation if these techniques are needed for clear, understandable explanations.

2. *It employs motion.*

Things that move or in which action is an identifying characteristic make effective motion-picture subjects.

A motion picture which explains the action of a jet engine will show the parts of the engine in action, if it is an effective film.

A film that is merely a series of architectural views is not truly a motion-picture film. Such views are better presented on still pictures or slides.

Effective motion pictures portray things and processes by means of description, movement, and action.

3. *It includes environmental sounds.*

The effective teaching film documents as much of the original environment as possible. It records color, form, and action, but it also records meaningful environmental sounds. Such sounds as the whir of machinery, the lapping of water, the characteristic noises of a railroad yard or a factory interior, the lowing of cattle, etc., add great realism to motion-picture visualization.

4. *It employs narration.*

Helpful explanatory narration accompanying motion photography is useful in directing the learner's attention and establishing his understanding of visualized relationships. Such narration is inherently related to the visual content; it is not merely a "lecture" that accompanies a photographic story.

5. *It employs color when it is useful.*

The effective teaching film records what actually exists. If color will assist in imparting understanding, comprehension, and aesthetic appreciation, then color is obviously desirable.

6. *It is related to the school curriculum.*

The teaching film is definitely related to the content and subject matter of the school curriculum. The film was made because it can provide understandable explanations by means of visualization and sound and thus make unique contributions to classroom learning.

Finally, the teaching film avoids the curriculum areas where it is less effective as a teaching device than other means of presentation.

A teaching film has been described as follows:

> The "educational sound film" implies the following points . . . (1) The sound film should include environmental and interpretive sounds appropriate to the action so as to make the content of the film more realistic. (2) The visual concepts included should be those which ordinarily cannot be interpreted to the student in the classroom. (3) The sound film should interpret, by a blending of the foregoing two factors, such audio-visual concepts as will stimulate the learner's eye and ear and make it possible for him to become aware of the whole situation portrayed just as if he were actually there at the scene of action observing a segment of life in all its completeness.[6]

Today teaching films are being produced in virtually all curriculum areas. The best way to become acquainted with these films is to preview

[6] Walter Arno Wittich and John Guy Fowlkes, *Audio-Visual Paths to Learning*, Harper, New York, 1946, p. 29.

them. Collections of educational films are available in all state universities, in most public and private colleges, particularly those with courses leading to teaching certificates, and in audio-visual centers in hundreds of city schools. Evidence of the increase in the number of educational film library collections is found in the U.S. Office of Education Film Library Directory. In 1950, it listed 2001 educational film libraries in the United States, as against over 3300 listed in the 1956 directory. Consult this directory for films available in your locality.

The producer of a teaching film is realistic in recognizing that if a film does no more than a good teacher can do with the instructional materials already in use, he had better turn his creative efforts elsewhere.

Fortunately the high cost of production makes it necessary to consider very carefully all the foregoing characteristics. Teachers are becoming more and more aware of the true contribution of the teaching film in improving instruction. The general level of effectiveness of these films is on the upswing. These two factors work to the advantage of the school and promise increasing numbers of high-quality teaching films.

SUPPLEMENTARY TEACHING FILMS

The 16 mm. teaching film is such an effective medium of communication that industrial groups, government agencies, and other special groups with a message are producers of motion-picture films.

Many of the films produced by these various agencies are offered to schools, for almost any film may be considered "educational" to some extent. The extent to which supplementary films are useful for classroom purposes varies. In order to help you distinguish the sponsored films which make a contribution to teaching from those that do not, the main sources and types of supplementary teaching films will be described.

As was said earlier, most of these films can be classified as documentary, sponsored, or entertainment films.

The Documentary Film

John Grierson, Pare Lorentz, aod Robert Flaherty were a few of the many men who were associated with a new and very expressive type of motion-picture film after World War II. Just as an artist chooses still life portraiture, or urban or rural life as his area of interpretation, these

skillful motion photographers chose the drama of people and their association with the forces of society and nature as their assignment. They called their medium of expression the documentary film.

John Grierson is still best known for his motion camera impressions of the herring fishermen of England. Through his skill as author, observer, and sensitive cameraman, *Drifters* (Silent, B&W, 60 min., BIS) lifts the little-known life of the fishermen from its commonplace level to one of high drama.

R. H. Watt created an artistic, fast-moving, fascinating, and also truthful story in *Night Mail* (Sound, B&W, 22 min., BIS), which shows the English postal system in operation. It is an account of a night train that carries the mail. For all its truth in reporting, the viewer sits in admiration and awe as the speeding wheels carry the ghostlike train of cars through the darkness. Yet *Night Mail* is actually meant to show nothing more than a routine mail run.

Robert Flaherty has been recognized for his documentary film stories of primitive men and their struggle to make a home in the harsh environments in which they live. His films on Eskimo life, *Nanook of the North* (Silent, B&W, 90 min., Museum of Modern Art), and on the daily life of the South Sea Islanders, *Moana* (Silent, B&W, 105 min., Museum of Modern Art), are so beautiful and at the same time so factual that sociologists and anthropologists consider them source material.

His last production before his death was *Louisiana Story* (Sound, B&W, 77 min., Standard Oil), which describes the development of the swampland oil fields in Louisiana. The story of the Cajun boy who watches the quietness of his swampland home and hunting ground disrupted by the oncoming derrick barges is gripping, awesome, and moving, as revealed through Flaherty's camera interpretation.

The River (Sound, B&W, 31 min., USDA), which pictures the ravages of the flooding Mississippi River, is one of the most widely used documentary films in the schools today. In this well-known and outstanding example of a documentary film, Pare Lorentz, its maker, has described the medium itself. He uses no sets or professional actors, but records events as they occur in reality. Many implied questions are raised—Can we control floods? Should we reforest? Should contour farming be used?

The documentary photographer can now achieve even greater reality by making his film in color. The National Film Board of Canada has

been remarkably successful in the production of very human and complete color films that carefully document broad social areas of Canadian life. Films like the following, all produced by this organization, are valued supplements to the social studies: *People of the Potlatch* (Sound, Color, 22 min.), *Portage* (Sound, Color, 22 min.), and *Skeena River Trapline* (Sound, Color, 16 min.).

A recent documentary, *Angotee* (Fig. 13.11), all but completes the cycle begun with *Nanook of the North*. *Angotee* is the culmination of decades of documentary efforts. *Angotee* typifies the documentary film makers' attempts to present the truth and it does this in beautifully realistic color that gives the viewer a new kind of audio-visual experience as he comes to understand an Eskimo family.

Fig 13 11. In this documentary, Angotee demonstrates the ability of films to interpret realistically and honestly one social-cultural group to another. Note the admixture of cultural influences.

Although many definitions of the documentary film have appeared in the literature, this statement by Paul Rotha is still one of the best:

> The immediate task of the documentalist is, I believe, to find the means whereby he can employ a mastery of his art of public persuasion to put the people and their problems, their labour and their service, before themselves. His is a job of presenting one half of the populace to the other. Of bringing a deeper and more intelligent social analysis to bear upon the whole cross-section of modern society; exploring its weaknesses, reporting its events, dramatizing its experiences and suggesting a wider and more sympathetic understanding among the prevailing class of society. He does not, I think, seek to draw conclusions but rather to make a statement of the case so that conclusions may be drawn. His world is in the streets, the homes, the factories, and the workshops of the people, presenting

this experience and that event to make his point. And if the documentary method today is being put to a double-headed use, if it is being employed to express a meaning within a meaning, then that is not the fault of the documentalist but of the time in which he lives.[7]

The documentary film can be an extremely useful teaching instrument, particularly in the social studies area. Good documentary films can show students how people live, think, and act. The opportunity to do this, to make possible a realistic understanding of social problems by the student, is today nearer fulfillment because of these films. Although generally produced for adults, they can bring valuable and heretofore inaccessible learning experiences into the classroom. Since the way to understand these films is to see them, arrange to preview as many of the following as possible:

And Now Miguel, Sound, B&W, 64 min., United World.
Angotee, Sound, Color, 32 min., International Film Bureau.
The City, Sound, B&W, 33 min., United World.
The Drifters, Silent, B&W, 60 min., BIS.
The Living City, Sound, B&W, 24 min., EBF.
Louisiana Story, Sound, B&W, 77 min., Standard Oil.
Morning Star, Sound, Color, 33 min., EBF.
Nanook of the North, Silent, B&W, 90 min., Museum of Modern Art.
Night Mail, Sound, B&W, 22 min., BIS.
Portage, Sound, Color, 22 min., National Film Board of Canada.
Skeena River Trapline, Sound, Color, 16 min., National Film Board of Canada.
Tuesday in November, Sound, B&W, 18 min., United World.
Valley of the Tennessee, Sound, B&W, 29 min., United World.
Waters of Time, Sound, B&W, 37 min., BIS.
World Without End, Sound, B&W, 45 min., UNESCO.

The Sponsored Film

Manufacturers, merchandisers, and distributors have been quick to detect the effectiveness of 16 mm. sound motion-picture films as a means of communication.

Literally hundreds of films are sponsored and produced each year by commercial firms for the purpose of telling the story of the manufacture and use of their products. Since the sponsored film is usually part of a broad advertising or informational program, it is generally organized so

[7] Paul Rotha, *Documentary Film*, Faber and Faber, London, 1936, pp. 130–131.

as to carry its message to the widest possible audience. Because the schools are sought as part of this audience and because more and more sponsored films are being produced each year, it is the responsibility of school people to understand this type of film, to accept the films which contribute to classroom learning, and to reject those that are of doubtful or no value.

Some educators feel that sponsored films are entirely acceptable in helping to meet the educational objectives of local school systems. Others refuse to use them on the ground that the school could become a captive audience for films which are biased in favor of a sponsor's point of view.

Since every film should be chosen in relation to the school curriculum, it is necessary to examine the sponsored film in terms of the present-day philosophy of the school curriculum.

As was brought out in an earlier chapter, there is growing insistence on the part of curriculum workers, parents, and teachers that community resources must be used to the fullest. There is likewise insistence that the selection and use of films in the classroom should be based on instructional needs. As the school investigates the community, it soon discovers that those best able to explain the community are the people who make up the community. Who is in a better position to explain telephone communication than the telephone company? Who is better qualified to describe the services of an international airline system than an airline company? Who is better qualified to describe how flax is grown by hand, harvested, and converted into linen than the Irish Linen Guild of the British Isles?

Of the many arguments against the use of sponsored films in the classroom, the foremost concerns the fact that the children will be easily impressed and influenced by a biased film presented in a situation in which they are used to accepting information as truthful and beyond question. If a sponsored film is biased or contains unwanted advertising propaganda, there is little doubt that the children will be influenced.

The responsibility here rests with the teacher. If a sponsored film contains information which can help create a desired learning situation, it should be considered for use. If not, it should be rejected. Today many sponsored films tell their story simply and effectively and avoid the flagrant advertising which fifteen years ago was characteristic of such films.

Some school people think that once they have ascertained the need for films in instruction, it is their responsibility to preview existing films and discover those that will help accomplish their goals. Sponsored films may be selected if they represent sound, straightforward, authentic explanations of subject content in geography, science, vocational arts, home economics, etc. But if such a film includes unwanted or irrelevant information in such quantities as to make its use undesirable, it should not be selected.

To understand sponsored films, you must preview them. As you see the following films[5] estimate their usefulness in terms of the points just enumerated:

ABC of Hand Tools, Sound, B&W, 33 min., General Motors.
Adventures in Telezonia, Sound, Color, 20 min., Bell Telephone.
Alaska's Silver Millions, Sound, B&W, 28 min., American Can.
Building of a Tire, Sound, Color, 28 min., Firestone.
Gift of Green, Sound, Color, 18 min., Sugar Information, Inc.
Jet Propulsion, Sound, Color, 15 min., GE.
New York Calling, Sound, Color, 22 min., New York Central.
Rehearsal, Sound, B&W, 23 min., Bell Telephone.
Wings to Hawaii, Sound, Color, 33 min., Pan-American Airways.
Wings to Ireland, Sound, Color, 25 min., Pan-American Airways.

The Entertainment Film

All of us are members of the "entertainment film generation," and therefore little time will be taken to describe the type of film produced by the Hollywood motion-picture industry. The films vary between the one extreme of "western," "murder mystery," "psychological drama," and "thrill-escape" films, and the other extreme of such prestige films as *David Copperfield*, *Romeo and Juliet*, and *Hamlet*.

Because the entertainment film is such a prevailing medium of communication, its intelligent evaluation and appreciation have become a standard work unit in many high-school English courses.

These films deal with anything and everything; hence it is not at all unusual for teachers to comment, after viewing them, "I wish I could show part of the *Story of Dr. Jenner* to my health class," or "If only I could have all my U.S. history students see *The Oxbow Incident*," or

[5] A complete list of sponsored films appears in *Educators' Guide to Free Films*, published annually by Educators Progress Service, Randolph, Wisconsin.

"If all my students could see *Hamlet*, I think they'd be more interested in reading Shakespeare." How many English teachers have wished that they could preface the reading of a novel with the film version!

Evidence that seeing a motion picture based on a story increases pupil interest in reading was gathered by staff members of the Cleveland Public Library. After a showing of *David Copperfield*, all 450 available copies of the book went into circulation. Elizabeth Golterman and Mark May refined this early information in a study in St. Louis in 1953. They discovered that an 18-minute version of the full-length feature film, *Kidnapped*, created more interest in reading the complete book than did seeing a 28-minute version.

Fig 13.12. Why does the showing of films like *The Mudlark* encourage the viewer to read more?

An association called Teaching Film Custodians (TFC) has had the cooperation of such professional education groups as the National Council of Teachers of English, the National Council for the Social Studies, and the Music Educators National Conference in systematically reviewing Hollywood productions for the purpose of shortening, excerpting, and otherwise reëditing selected titles in a form suitable for school use. These edited TFC excerpts are widely used in schools today. You should see those in the following list,[9] and judge their usefulness in terms of known subject-matter objectives.

SOCIAL STUDIES

Due Process of Law Denied, Sound, B&W, 29 min.
Give Me Liberty, Sound, Color, 21 min.
Johnson and Reconstruction, Sound, B&W, 33 min.
Justice Under Law, Sound, B&W, 30 min.

ENGLISH AND LITERATURE

Adventures of Huckleberry Finn, Sound, B&W, 38 min.
Christmas Carol, Sound, B&W, 37 min.

[9] Teaching Film Custodians, Inc., *Films for Classroom Use*, New York, 1950

David Copperfield, The Boy, Sound, B&W, 42 min.
David Copperfield, The Man, Sound, B&W, 45 min.
Tale of Two Cities, Sound, B&W, 40 min.
Treasure Island, Sound, B&W, 38 min.

MUSIC

Great Waltz, Sound, B&W, 20 min.
Inside Opera with Grace Moore, Sound, B&W, 28 min.
Naughty Marietta, Sound, B&W, 34 min.
Schumann Story, Sound, B&W, 30 min.

HEALTH AND PHYSIOLOGY

Man's Greatest Friend, Sound, B&W, 10 min.
One Against the World, Sound, B&W, 11 min.
Story of Dr. Jenner, Sound, B&W, 10 min.
Story of Louis Pasteur, Sound, B&W, 34 min.
They Live Again, Sound, B&W, 11 min.
Triumph Without Drums, Sound, B&W, 10 min.

VALUE OF 16 MM. SOUND FILMS

Ask the children who see films during their classes what they think of them, and there will be many responses.

Films can affect the whole climate of instruction. Careful selection and use of teaching films can result in positive changes in pupils' interest, learning efficiency, retention of learning, and reading performance; furthermore, films offer a natural path to learning.

INCREASED PUPIL INTEREST

A research study by Wittich and Fowlkes[10] reports reactions of school children to the use of films. Members of the intermediate grades were allowed to see carefully selected teaching films in science and the social studies. At first some of the children were not much interested in the use of films in work-study situations, but by the end of the school year the following changes in interest and attitude were evident:

> Sound movies made it easier for me to understand about things. They don't use such big words as the geography book does.
> Seeing the films gave me new and different ideas.
> I learned from the films how countries really look, how people look. I got a better idea of what part of the world the country was at.

[10] Wittich and Fowlkes, *op. cit.* The following quotations in this section are from this title.

I never knew how some of the people lived when I read in books and I didn't know what kind of clothes they wore or how they looked.

It's fun and interesting because it tells what books don't tell. It makes it more plain to me. I can really see things.

In response to the question, "Do you like this way of learning?" such statements as the following were made by these students. Note the variations shown in these responses.

Case 1—I.Q. 135; reading score 9.6.

I liked the sound films because they are a new way of learning, and a movie gives more information than just reading. . . .

Case 12—I.Q. 114; reading score 7.6.

I like the sound films because I get more out of what I can really see. . . .

Case 18—I.Q. 105; reading score 8 2.

This way of learning shows tho way things are done. It's easier to understand the subject. . . .

Case 28—I.Q. 95; reading score 5.9.

I like this way of learning because I get information that I would not bo able to find in books. . . .

Case 30—I.Q. 85, reading score 5.7.

I like this way of learning because I can see all the details. . . . In books there are only words and I can't see much of a background. In films I can hear the people.

The fact that these pupils so consistently mention the clarity and understandability of films as learning devices leads to the observation that *pupil interest is enhanced because the sound film is a realistic way of learning,* like that used in out-of-school situations. We are conscious of our everyday environment because we observe it through sight, sound, and mind. A good teaching film is interesting because it presents information in a realistic manner. It is natural to learn by seeing and hearing.

INCREASED FACTUAL LEARNING

Early studies by Wood and Freeman,[11] Wise,[12] and Knowlton and Tilton[13] uniformly gave evidence to the effect that when carefully selected silent films were used with regular classroom study materials, advan-

[11] Ben D. Wood and Frank N. Freeman, *Motion Pictures in the Classroom*, Houghton Mifflin, Boston, 1929.

[12] Harry A. Wise, *Motion Pictures as an Aid in Teaching American History*, Yale University Press, New Haven, 1939.

[13] Daniel C. Knowlton and J. Warren Tilton, *Motion Pictures in History Teaching*, Yale University Press, New Haven, 1929.

ADVANTAGE IN LEARNING

Sound Motion-Picture Films Compared with Traditional Learning Materials

ADVANTAGE THROUGH FILM USE

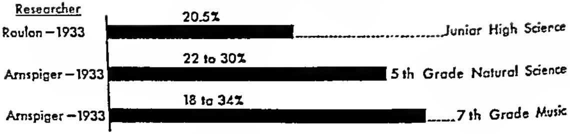


Fig. 13.13.

tages in learning resulted that were above and beyond what could be accomplished with more traditional instruction materials. These studies reflected the pre-sound film period in the school use of films.

After the advent of the sound film into the classroom in the 1930's, research was undertaken to discover if this new communication device was as successful as its predecessor, the silent film. The chart in Fig. 13.13 answers this question in the affirmative.

Rulon describes the results obtained from using several selected sound films with ninth-grade general science students: "In terms of immediate student achievement, our results indicated that the teaching technique employing the motion-picture film was 20.5 per cent more effective from the instructional standpoint than was the usual unaided presentation."[14]

Arnspiger sought to measure the effects of using sound films with almost 2400 fifth- and seventh-graders in schools in five eastern cities. The results showed that their use made distinct contributions to learning: "The per cents of superiority ranged from 22 to 30 in the natural science units and from 18 to 34 in the music units."[15] Other researches conducted during these same years by Consitt, McClusky, and Weber, among others, showed similar supporting data.[16]

[14] Philip J. Rulon, *The Sound Motion Picture in Science Teaching*, Harvard University Press, Cambridge, 1933, p. 98.

[15] Varney C. Arnspiger, *Measuring the Effectiveness of Sound Pictures as Teaching Aids*, Teachers College, Columbia University, New York, 1933, p. 83.

[16] Francis Consitt, *The Value of Films in History Teaching*, G. Bell & Sons, London, 1931; Frederick K. McClusky, *An Experimental Comparison of Different Methods of Visual Instruction*, doctoral dissertation, University of Chicago, 1922. J. J. Weber, *Comparative Ef-*

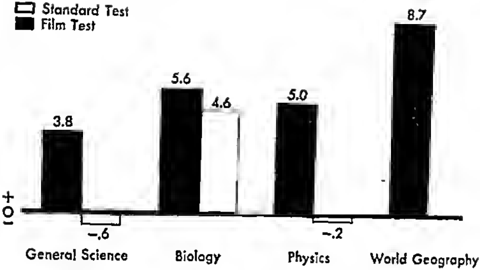


Fig 13.14. High-school gains in learning through the use of motion pictures

Similar results were recorded by Meierhenry and others in Nebraska. These researchers measured the results of using 16 mm. sound motion-picture film with high-school students in twenty-eight Nebraska communities.[17] The findings indicated superior gains among students who used films, particularly in general science, biology, physics, and world geography (Fig. 13.14).

There is adequate research evidence to support the fact that when carefully selected teaching films are added to the classroom array of learning materials, positive contributions are made in the form of more effective learning of pertinent factual information.

RETENTION OF LEARNING

Research studies which measure the permanence of information learned from films consistently show that films are superior to verbal materials when retention is measured by delayed or duplicate form tests.

Knowlton and Tilton administered delayed tests at intervals of from three to seven months after the film lessons were completed. They found that films influenced retention as follows: About 12 percent more

fectiveness of Some Visual Aids in Seventh-Grade Instruction, Educational Screen, Chicago, 1922.

[17] Wesley C. Meierhenry, *Enriching the Curriculum Through Motion Pictures*, University of Nebraska Press, Lincoln, 1952.

ADVANTAGE IN RETENTION

Sound Motion-Picture Films Compared with Traditional Learning Materials

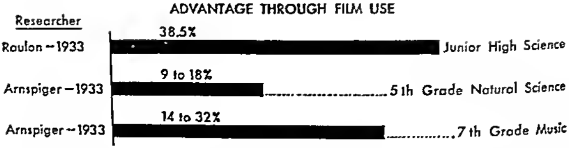


Fig. 13.15.

information was retained from film learning than from verbal, and retention of historical geography was 14 percent greater from films.[11] The relationship between retention and sound films is shown in Fig. 13.15.

Thus research indicates that when children learn through teaching films, definite advantages in retention of factual information occur.

INCREASED READING INTEREST

The relationship of films to reading interest and skills has been one of the points most argued by those who favor and those who oppose the growing use of films in the classroom.

Some people believe firmly in the inviolability of reading as a source of information and hence maintain that the increasing use of films in instruction adversely affects interest and skill in reading. This concern is unwarranted.

Wood and Freeman sought teacher reactions regarding the effect of silent films on interest in reading. They report:

> Three fourths of the teachers [93 participated in the experiment] believe that the films increase the quantity and quality of the children's reading. This opinion is confirmed by the report of the school librarians. In several cities administrative officers of the schools said that school librarians have reported that library facilities were not adequate to care for the increased library demands of the children involved in this experiment.

The teachers' own responses further confirm this reaction: "The quality of reading has been improved because the child has an intense desire to find out a definite thing. The study guide was an aid in organizing

[11] Knowlton and Tilton, *op. cit.*, p. 91.

and judging the information found on the topic. The many contacts the picture gave increased the quantity of reading."[19]

Knowlton and Tilton report that seeing silent films caused the children "to read voluntarily more supplementary history material under controlled classroom conditions."

An attempt was made later to check such information.[20] The school librarian was asked to devise a means of checking the reading done voluntarily by the intermediate-grade pupils of a large urban elementary school, and in 1946 a system of recording book withdrawals was instituted which enabled the reading habits of over 800 children to be studied. The children who regularly saw sound films in their classes did over 50 percent more voluntary reading, as evidenced by book withdrawals, than the group with whom no films were used.

The usefulness of the 16 mm. sound motion-picture film in assisting in improving reading was measured in 1952–1953 by Paul Witty, James Fitzwater, and Harriet Gorman. Their study, which tested the influence of eight selected sound films on the reading ability of second-grade children, showed that 95 percent of the children improved in reading, 95 percent showed vocabulary improvement, 70 percent could express more and better ideas during class discussion, and 99 percent wanted to continue the work with films. When these findings were checked against the judgment of participating teachers, the results showed that children learned to read faster, class discussion improved, independent reading increased, and vocabulary, the key to success in reading, was increased.[21]

In 1955 Louis Romano investigated the effect, among fifth-, sixth-, and seventh-grade pupils in the Shorewood, Wisconsin, Public Schools, of the 16 mm. motion-picture film and related still pictures (both projected and nonprojected) on mastery of specific science vocabulary taken from reading materials.[22] His study is unique in that he chose as his subjects

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[19] Wood and Freeman, *op. cit.*, pp. 153–154.

[20] Walter Arno Wittich, "Effects of Film Use in Reading Habits," unpublished study, 1946

[21] Paul Witty and James P. Fitzwater, "An Experiment with Films, Film-Readers, and the Magnetic Sound Track Projector," *Elementary English*, April, 1953, pp. 232–241.

[22] Louis Romano, "The Role of 16 mm. Motion Pictures and Projected Still Pictures in Science Unit Vocabulary Learnings at Grades 5, 6, and 7," unpublished Ph D. thesis, University of Wisconsin, 1955.

children who were already used to a learning environment that their teachers considered unusually enriched.

Greater vocabulary gains were made by the film-using groups (Fig. 13.16). The fifth-grade film-using pupils learned up to 300 percent

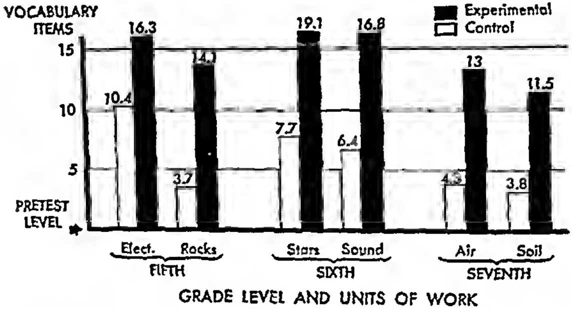

Fig. 13.16. Gains in vocabulary, fifth through seventh grades, resulting from using selected sound motion-still projected pictures.

more science vocabulary, the sixth-grade groups twice the vocabulary, and the seventh-grade groups 200 percent more than the control groups learned.

Research evidence establishes the fact that the regular use of teaching films produces in pupils the desire, interest, and readiness both for more reading and for more comprehensible reading.

SELECTION OF FILMS

The teacher of almost any subject and grade has available numerous sound motion-picture films. Each week sees the production of new ones for school use. Today three of the leading producers of teaching films (Encyclopædia Britannica Films, Inc., Coronet, and Young America) release new ones at the amazing rate of one or more each week. From this large supply the teacher is asked to select the few that will improve the learning opportunities of the class.

The producer of a teaching film usually studies carefully the sales pos-

sibilities of a proposed film; he may also study the teaching problems. If he believes the film can assist in improving the learning situation, he will invest the time, effort, and money required for its production. This in itself is one important phase of film selection. In the past many poor films were produced, only to lead the producers into bankruptcy. Today the trend is toward the production of more effective teaching films.

A second circumstance that assists the teacher in selecting films is the fact that most distributors of these films ask teachers to try them out in their classrooms before they are purchased. In this way valuable information can be gathered about the effectiveness of the films. In some cases teachers' comments are incorporated in the catalogue description of the film.

The responsibility for the selection of films rests with the teacher. Before selecting a film he should have definite reasons for using one. If his students have shown readiness for learning about the culture of people in North Africa, the teacher will assemble suitable learning materials. These may include such traditional materials as books, maps, a globe, bulletin board pictures, models, and specimens. His knowledge of what a film can contribute may lead him to search for film-presented information; but he must consider the pupils' interests, maturity levels, and reading difficulties when selecting *the* film which can make a real contribution to his class.

CONSIDERATIONS IN SELECTION

Two considerations are basic to film selection: (1) Does the film make a contribution? Is the film a source of information beyond that available with materials already in use or available for use? (2) Is the film of a high quality? These two considerations will be expanded and illustrated.

The Contribution Made by the Film

1. *A useful teaching film contains authoritative information.*

In years past it was not at all uncommon to find gross errors in films for classroom use. Now, however, film production includes painstaking study and authentication of content.

Today most teaching films carry the name of a well-known and respected authority on the subject treated in the particular film. The name of an authority on the title page of a textbook bears much the same re-

lationship to the content of the book as does the name of a collaborator to the content of a film.

2. *A useful teaching film is keyed to a definite age group.*

Many useful and well-produced films may include information on the same general subject, but it is presented in such a way as to be interesting and completely understandable to a specific age group, such as primary or junior-high-school children, or adults.

Fig. 13.17. For what age groups do you think this film—*Animal Homes*—would make its greatest contribution?

One film about polar bears describes their antics and habits in terms understandable by small children. Another film on the same subject painstakingly describes the genus *Thalarctus maritimus* (polar bears). It will be *most* interesting and understandable to college zoölogy students.

The teacher must search for and select the film that will challenge the age group it will be used with. The speed with which the film moves from scene to scene, the pace of the dialogue or narration on the sound track, the age level of the content—all must be evaluated in terms of the learners who will use the film.

3. *A useful teaching film must contribute to the group learning situation.*

A film on social behavior methodically records the dialogue used when making introductions. Practically the same dialogue will be found in any modern English textbook in use in a junior high school. If the textbook version accomplishes as much as the film version, the film has no outstanding contribution to make.

In contrast there are films which bring remote people and places into the social studies classroom. Others show demonstrations involving equipment seldom found in classrooms. Still others present interesting,

graphic, and authentic records of events that occur once in a lifetime. Films of this type present experiences which are available through no other medium. Such films are extremely valuable in making possible complete understanding of a given learning problem.

4. *A useful teaching film is keyed to the curriculum problem or unit of study.*

Film libraries contain a host of films which are authentic, interesting, full of information, and understandable by school children. It is the teacher's task to select the few which will give the students more complete understanding of the unit of work with which they are concerned.

A film which compares two forms of government with the obvious purpose of "proving" the superiority of one form over the other is not the kind of teaching material for a Problems of Democracy class, but it might well be used to study propaganda methods.

The question is no longer, Is it interesting? but rather, Does it present authentic information which is needed in the current learning problem? In short, does it help in what the school of today is attempting to accomplish in classroom work and experience?

The Quality of the Film

Just as the teacher, in selecting a textbook or supplementary reader, pays attention to size of type, quality of paper, binding, illustrations, and general attractiveness of format, so the teacher who is selecting films must give attention to similar characteristics in the teaching film—quality of the photography, quality of the sound, general organization of content, and availability or lack of teaching aids.

1. *A useful teaching film is well photographed.*

It is essential that instructional films be photographed as vividly and carefully as possible. The film must be well lighted rather than too dark. The viewer must be able to see a well-defined projected image. The camera must be in focus so as to produce a sharp, distinct image on the screen. The photography must vary with the type of material, so that a subject will remain on the screen longer when time is needed to understand it, and shorter when only an impression is required.

2. *The film is presented in color if color will increase the viewer's understanding.*

Many subjects—such as animals, mechanisms, objects in nature—are identified through color (see pages 380–381). When color is used it should be as close to the real color as possible. Color photography which is heavily overcast with bluish or greenish hues is not desirable because it does not portray true natural colors. Poor color is often worse than no color at all.

3. *The useful teaching film can be heard distinctly.*

Learning advantages are greatest when the viewer can see and hear what he is investigating. When sounds help identify an object or process, a clear, lifelike sound track is esseotial.

The film whose sound track has muffled or entirely inaudible low notes, or distorted, thin high notes, misses the opportunity to impress the viewer as being realistic. Today it is possihle to produce clear, natural, and easily heard sound films. The good teaching film is heard so distinctly that the listener becomes engrossed in the visual experience and pays oo attention to the quality of the sound *per se.*

4. *The useful teaching film is well organized.*

By the organization of a sound film is meant the smooth flowing together of photographed scenes and the accompanying sound. The viewer is not conscious of this quality in a well-organized film because the narration or explanatioo moves along from scene to scene with scarcely recognizable shifts.

In such a film, mechanical devices such as fades (the slow disappearance of one scene before the following one appears), quick cuts (abrupt shifts from one scene to another), dissolves (the merging of the end of one scene into the beginning of the oext), and many others are all skillfully used in punctuating and giving meaning to it.

A film which is jerky, meanders, or has confusing sequences interferes with the audio-visual experience it attempts to create.

5. *The useful teaching film is usually accompanied by teaching aids.*

These may take the form of study manuals or study suggestions concerning the effective use of the film in one or more learning situations.

SELECTION THROUGH PREVIEW

The most effective way to select films is to preview them. Under some circumstances, this may be done in class so that the reactions of the students may be noted (Fig. 13.18). However, sound film equipment

Fig. 13.18. How will such reactions as these influence the teacher's decision about using this film later as part of his regular work-study program?

should be accessible to every teacher so that he may preview whenever films are available. *There is no substitute for preview.*

Unlike books, which can be quickly skimmed over if there is no time for more leisurely examination, a teaching film must be seen—if not in its entirety, at least as long as is required to discover whether it is of such potential value that the teacher should see all of it. A sound film takes 10 minutes for each 400-foot reel, and there is no satisfactory way of speeding it up.

Methodical previewing leads naturally to record keeping. In previewing, the teacher should keep in mind the points just discussed. Keeping methodical preview records over a long period of time will enable the teacher to know about useful films in his particular subject area. The following record form is suggested:

FILM SELECTION GUIDE

Title of film .... *Previewed by* ....
Rental source and charge ....
Purchase source and charge ....

Produced by .... Subject collaborator ....
Use data
1. Is the film authentic? .... Comment: ....
2. Useful in grades ....
3. Are experiences contributed which are beyond what *can be accomplished* with traditional materials now used? ....
List outstanding contributions ....
....
....
....
4. Curriculum or unit of study use suggestions: ....
....
....
5. Color is not used .... is used .... to give meaning to such things as
....
....

Format
1. Photography: excellent, good, poor. Comment: ....
2. Sound: excellent, good, poor. Comment: ....
3. Organization of content: excellent, good, poor. Comment: ....
4. Accompanying study materials include: ....
5. Color: *superfluous, desirable, demanded for complete meaning. Comment:*
....
....

Brief description of film content: ....
....
General film rating: excellent, good, poor: ....
Recommend for future use: Yes .... No .... Reason ....

EFFECTIVE USE OF THE TEACHING FILM

There are many ways of using a film in the classroom. We shall examine several possibilities. The following represents one level of film use:

> TEACHER. This morning we are going to begin the study of simple machines. We will begin our study by seeing a *film*. It's a good film. Now keep your eyes and ears open and we'll all learn a lot! Lights out!

A second teacher who uses the same film is able to help her pupils acquire almost double the information from seeing and hearing that film. The difference between what each group learns from the film represents the difference between each teacher's plan for using it.

EFFECTS OF THREE TYPES OF FILM INSTRUCTION ON AMOUNT OF INFORMATION LEARNED BY ELEMENTARY PUPILS

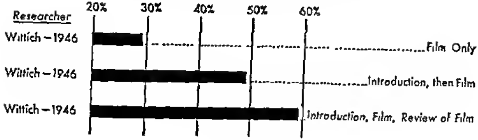

Fig. 13.19.

The teacher's role in film utilization is summarized in Fig. 13.19.[23] The upper bar indicates the level of achievement gained when elementary-school pupils (fourth, fifth, and sixth grades) viewed a film without any organized preparation. The class had been prepared for seeing this film only in the course of casual and unorganized classroom work. After seeing the film, the pupils answered test questions.

The middle bar indicates the level of achievement attained when these pupils viewed a film after being definitely prepared. The class was asked, prior to seeing the film:

1. To read a brief story-like description that conveyed a general impression or mood.
2. To study difficult words and phrases in the sound track.
3. To anticipate further the content of the film by studying questions which led toward large areas of information presented in the film.
4. To view the film after the above three steps were completed.
5. To take a test immediately after seeing the film.

The third bar indicates the level of achievement attained when these pupils viewed a film after definite preparation and were given follow-up activities. In addition to the above five steps, the class was asked to do the following things twenty-four hours later:

1. To answer a prearranged series of discussion questions.
2. To see the film a second time.
3. Immediately afterward, to take the test a second time.

[23] Prepared from data presented in Wittich and Fowlkes, *op. cit.*

The chart shows that careful planning can nearly double the effectiveness of a teaching film in terms of the information acquired by the pupils who see it.

The teaching film is a powerful and useful instructional tool. Its ultimate effectiveness, however, is largely determined by the teacher and the manner in which he uses it. In too many cases the film has been considered a "package" of information. Because it tells a rather complete story or gives a well-developed explanation of a process or phenomenon, many teachers have used it in a way that assumes it to be both "book and teacher."

If the teaching film is used as a supplementary teaching material, a great deal of its potential effectiveness is found in the way it is introduced into the classroom.

Several teaching responsibilities apply as surely to the effective use of films as to the intelligent use of books, maps, models, charts, and field trips. These responsibilities include interest, vocabulary, planning, classroom conditions, pupil evaluation, and follow-up activities.

1. *Interest the learner in seeing and hearing the film.*

In the absence of interest, little or no learning may take place. Likewise, unless a child wants to see a film, he may learn little from seeing it.

The teacher can awaken interest in many ways. He can talk about the subject to be studied, and ask the children what they know or wish to know about it. For example, the following conversation preceded seeing the film *Farmers of India* (Sound, B&W, 17 min., United World):

TEACHER. What ideas do you have about the farmers of the Ganges River valley of India? (*Pause while the children think.*)

PUPIL. They worship cows and insects.

PUPIL. They have many strange customs.

PUPIL. Too many people live in India—so many that they all don't have enough to eat.

PUPIL. They have queer music—it sounds all "clangy" and "high."

PUPIL. They're not very bright.

TEACHER. Why do you think that, William?

WILLIAM. I'm not exactly sure. I've heard that, though.

TEACHER. William says he *heard* that the Indians were "not very bright." Is that a good way to get information?

CLASS. No.

PUPIL. He should try to find out if what he's heard is right.

TEACHER. How can you find out, William?
WILLIAM. I can read about it—or ask you.
TEACHER. Yes, read books about India. And, since this is going to be your job, I'll expect you to find answers.
PUPIL. We could look at a film about India and the farmers who work there.
TEACHER. Yes. Now let's return to my first idea. What *questions* do you have about the farmers of the Ganges River valley of India?
PUPIL. The people! What are they like?
PUPIL. How do they dress?
PUPIL. The children! Do the children go to school?
TEACHER. I'm glad someone mentioned children.
PUPIL. Do they play games?
PUPIL. I'd like to see their homes. I wonder if they're like ours?
TEACHER. Let's put some of our ideas and questions on the chalkboard.
(*Teacher begins the following lists:*
1. Ideas I have about farmers of India
   a. Strange customs
   b. Poor farmers
   c. *Little* food, *etc.*
2. Questions I have about farmers of India
   a. *What are houses like?*
   b. *What are the children like and how do they work and play?*
   c. *How do they dress? etc.*) [24]

By asking a challenging question or two, this teacher has gained the attention and interest of his pupils. Regardless of what they were thinking about when he began, more and more of them are now thinking about the subject to be studied, India and the people who live in the Ganges valley.

This teacher knows that if he can help the learner express his own questions about India, the student will discover real and personal reasons for finding answers to them. As this class discussion continues, more responsibility will be assumed by the children for answering their own *questions, for inquiring, for seeking* new information. Soon they will be "ready" for the experience of *acquiring information* from the teaching film itself.

The teacher often can contribute interesting facts or anecdotes about the place or object being studied. If you were in the intermediate grades

[24] Excerpt from recorded classroom discussion in which one of the present authors participated.

and were preparing to study a film on honeybees, wouldn't you become just a little more curious about that insect if the teacher spoke to you as follows:

Can you remember hearing a familiar Bzzzzz-Bzzzzzz-zzz near the flower bed or out in the open fields or in the woods? That's the busy signal of a flying sugar factory, wax factory, and harvest combine.

Fig. 13.20. A scene from the film Honeybee.

Why all of these? A sugar mill on wings because with lightning swiftness it gathers nectar from flowers which in its special stomach sac is transformed into honey; a wax factory because from under scales on its abdomen that substance may be secreted, gathered up and built into a nest; a harvester because not only is food collected for its own use, but by carrying pollen from blossom to blossom, many of Man's crops develop to maturity.

And what is this miracle of Nature? The honeybee—the worker honeybee![25]

In anticipating the study of pioneers of the western plains (high-school level) the teacher can tell or read about interesting situations which possibly only he knows about and which cannot be found easily in books or films. A "side light" like the following will give students added reason for finding out both about the people who took advantage of the free lands of the West and what the people and land were like:

Then came the Homestead Act of 1862 which opened the West, almost for the asking, to those citizens who were brave enough and hardy enough to seek out the land and hold it.

It promised that: "Any citizen of the United States, 21 years or older, who has never been an enemy of the government, is entitled to 80 to 160 acres of land if he agrees to live on it, to farm it, and to improve it for 5 years."

Thus, by living up to the terms of the act and by paying the United States government $18, any citizen could claim a quarter section of land as bis own.[26]

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[25] Visual Learning Guide for *Honeybee*, National Audio-Visual Council, Chicago.

[26] Visual Learning Guide for *Pioneers of the Western Plains*, National Audio-Visual Council, Chicago.

digestive movements	gastric juice
peristaltic	duodenum
intestines	pancreatic juice

We may ask, "Why is it necessary to use such big words?" They may be big, but they are the language of biology. If we wish to learn about digestion, we have no alternative but to know the meaning of special words used to describe the process.

Teaching the meaning of words which are specific to a given subject area is the individual responsibility of the teacher of that subject. Since every special subject has its own vocabulary, every teacher is a vocabulary teacher, at least to some degree.

Some new words may be explained by the film itself because visual concept and word concept are closely related. Other words should be studied beforehand so that learning will be enhanced rather than retarded when the film is shown.

A case of vocabulary confusion occurred when a group of intermediate-grade children were attempting to define some words used in a film about China:

TEACHER. "Characters." We talk about Chinese characters. What does that mean, Allen?

ALLEN. It means queer individuals.

TEACHER. That is the contemporary meaning, is it not? Well, it is a good thing that we studied that word, a very good thing. What else might it mean, Leonore?

LEONORE. Well, it might mean that they use them [characters] to write with.

TEACHER. These queer characters, you mean? Instead of letters of the alphabet, what do the Chinese use to write or to read, to make up words?

EDITH. They use "signs."

TEACHER. They look like signs, don't they? We will see these signs or symbols in the film. These are the things that make up the words, so when they talk about characters, we will know they don't mean queer individuals, won't we? We will mean these "things" that they use instead of the letters of the alphabet. Boys and girls, do you see how important it is to study some of these tricky words before we go into a new learning experience? Do you think it is worth the time? (*Pupils nod agreement.*)[27]

In this situation the words were confused because commonplace,

[27] American Association of School Administrators, *Official Report*, 1948, p. 125.

everyday meanings were substituted for specific meanings used in the film.

Frequently a teacher assumes that the vocabulary growing out of general reading or oral communication is sufficient to allow learners to understand specific teaching films. This is a dangerous assumption.

Examine this list of some of the unusual words used in the sound track of the film *Honeybee:*

abdomen	drone	royal jelly
cells	larva	swarm
cross-pollination	nectar	wax
	pupa	

Unless the sixth-graders who are to study and learn about bees have a reasonable understanding of such specific words as these, they will certainly understand only partially what takes place in the film.

Judge for yourself what will happen if pupils do not fully understand such words as the following before seeing the teaching film *Simple Machines* (Sound, B&W, 10 min., EBF):

force	lever	wedge
fulcrum	load	windlass
gear	pulley	work
	screw	

We may reasonably ask, Won't the learner acquire the meanings of these words from the film and the word descriptions? Without doubt he will acquire some new meanings. However, the organization of a film usually implies certain levels of ability and knowledge and the film often proceeds at a pace which does not permit the pupil to pause and reflect over the meaning of specific scenes or words.

The need for specific vocabulary study is apparent in almost every area of film utilization. Many pupils are denied all the advantages of learning from films because they are allowed to see the films without proper vocabulary preparation.

Ineffectual vocabulary work with respect to audio-visual materials is sometimes closely related to reading habits:

TEACHER. When you are reading and you bump into a new word that you don't know—now, be very honest with me—what have you sometimes done?

EDITH. Well, sometimes we skip over it.

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TEACHER. When you are reading and you bump into a new word that you don't know—now, be very honest with me—what have you sometimes done?

EDITH. Well, sometimes we skip over it.

TEACHER. You skip over it? Do any of the rest of you skip over a hard word? (*All nod.*) All of you? I think all of us would admit that we have done that, many times. But that isn't the way to learn, is it? What should we really do, Rosemary?

ROSEMARY. We should look it up in the dictionary.[23]

Specific vocabulary knowledge is an important factor in determining the effective use of the teaching film. Prestudy of the film vocabulary makes for more effective use of the film in the classroom.

3. *Help the learner plan his search for information before he views the teaching film.*

Often the most effective study plan a pupil can make involves his awareness of questions to which he seeks answers. When the teacher asked, "What questions do you have about the farmers of the Ganges River valley of India?" the children listed the following:

1. What are the people like?
2. How do they dress?
3. What are their homes like?
4. Do the children go to school?
5. What games do they play?

The children responded with these questions because they actually existed in their own minds. Hence these questions form one part of a study plan which is not only interesting but very important to the children themselves.

A good study plan is largely an expression of the pupils' own search for answers and information. It is not teacher-imposed; rather, it is an outgrowth of pupil-teacher planning.

The learner can best approach the viewing of a film if he has in mind known, clear-cut purposes for seeing it. A film-study plan will help him organize his impressions.

Insofar as the pupil knows his film-learning responsibility before be sees the film, the experience of seeing it will itself take on additional meaning.

For many reasons the teacher will want to add his ideas to the study plan. He may ask additional questions, emphasize one or more of those the pupils have suggested, or warn the class not to be disappointed if all their questions are not answered by viewing a single film.

[23] *Ibid.*

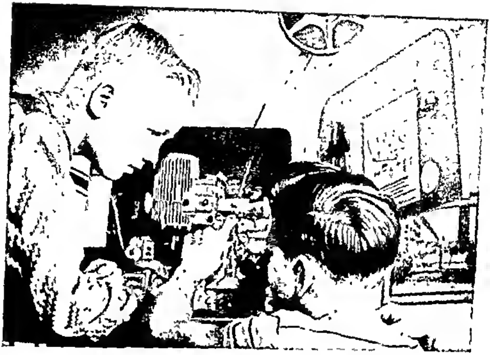


Fig. 13.21. Under what circumstances can pupils help accomplish a good classroom viewing situation?

4. *Create the best possible classroom conditions in which to view the teaching film.*

Because pupils work on day-to-day school projects in their own classroom, it is here that the teaching films should be viewed. Classrooms should be so arranged and equipped as to allow every pupil to see a well-defined image on the screen, and to hear without distortion or strain the sounds which accompany the film.

Before a film is shown, the projection equipment should be set up and placed properly in relation to the screen. The film should be threaded into the machine and the projector tested for focus and sound so that it can be switched on the moment the class is ready to see the film as part of the learning activity.[20] (See Fig. 13.22.)

The screen should be of such size and so placed that all can see it perfectly. By walking from pupil to pupil, the teacher can quickly judge the viewing and hearing conditions for each child in the room. (See Fig. 13.23.)

[20] *Projecting Motion Pictures*, Sound, B&W, 18 min., Educational Film Sales Dept., Extension Division, University of California, Los Angeles.

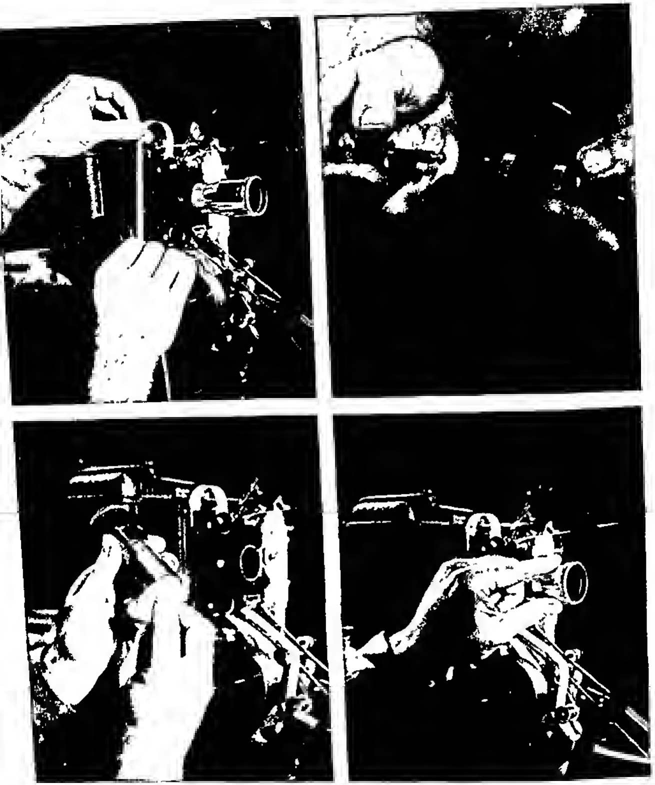


Fig 13.22. Before class begins, thread the film into the projector and test it manually (*top left*). Check all electrical connections (*top right*). Clean the dirt and grease from optical surfaces (*lower left*). Set the projector in motion, check the sound and the location of the amplifier, and adjust the focus. Then turn the film back to the beginning and turn off switches (*lower right*).

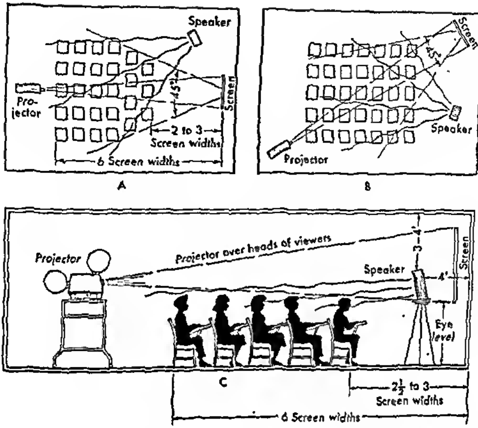


Fig 13.23. Suggested classroom projection arrangements. *Top left*, in classroom with movable chairs or desks; *top right*: in classroom with fixed desks, *lower*: projection over the pupils' heads. The speaker should be placed so that the sound is at or slightly above ear level and is directed at the center of the listening group.

Room ventilation should duplicate the general air-change and circulation specifications recommended by school building authorities for regular classroom use, namely, 15 cubic feet per person per minute.[30]

The acoustics should allow every child to hear lifelike, completely understandable tones from the sound track.

Control of the light in the room is essential. The distance from the camera to the screen and the power of the light source in the projector determine whether more or less light should be kept out of the room in which a film is being shown. Shades, drapes, louvers, or blinds should be

[30] National Council on Schoolhouse Construction, *Guide for Planning School Plants*, Nashville, 1949.

standard equipment in every classroom in which day-to-day teaching calls for the use of projected instruction materials. Diagrams, pictures, and specifications concerning room light control are presented in Chapter 16 (pages 530–532).

5. *Give the children opportunities to evaluate the film learning experience.*

An effective way of evaluating this experience is to encourage pupil discussion after the film has been shown. The following record of one such discussion reveals a few of the learning outcomes gained by intermediate-grade children from viewing the film *Children of China* (Sound, B&W, 10 min., EBF):

TEACHER. Let's talk about some of the answers that we found [to the question, "Do Chinese children enjoy sports and games as we do?"].
JANE. They play checkers and some other games, too.
TEACHER. Did you find out anything else about sports? . . .
JOEL. Well, one of the boys wanted to go swimming, and I don't know the game they played, but then they played checkers.
TEACHER. That's right! Edith?
EDITH. I saw some girls jumping rope when they were at school.
TEACHER. Yes, just as you jump rope. But the important thing is that those children, just like you, are interested in sports.
EDITH. I found that their school is much like ours, but they read and write differently.
TEACHER. Yes, the main thing again, they have schools. . . . I don't think, Edith, that you could read that book [you saw in the film].
EDITH. No, I couldn't. They read backwards. They start from the back of the book instead of from the front.
TEACHER. Could you read their writing?
LEONORE. No. . . .
SANDRA. I didn't know they had Girl Scouts and Boy Scouts, too.
TEACHER. Do you think they have them all over China?
SANDRA (*with doubt*). Not all over. (*Silence from others.*)
(*Pause.*)
TEACHER. Well, we would have to find out, wouldn't we? We would have to do some more studying.[21]

Often during an evaluation discussion it becomes apparent that there is need for further study. This may involve turning to additional sources

[21] American Association of School Administrators, *op. cit.*, p. 129.

of information, such as books, periodicals, filmstrips, recordings, and maps. Frequently the discussion awakens a need to refer to the film again.

Evaluation discussion can reveal to the pupil his own need for further study. It serves as a basis for (1) reference to additional learning materials and (2) restudy of materials already used.

When the need comes from within the pupil, the restudy of a teaching film can be a purposeful and highly profitable learning experience.

A more formal evaluation can be made by means of written essay or objective test questions. If a subject is complex and if mastery depends on an awareness and understanding of many related but detailed bits of information, a carefully planned series of questions is often desirable in evaluating learning outcomes.

This method was used with the high-school film *Modern Weather* (Sound, B&W, 19 min., USOE):

Test yourself on what you saw and heard in the film.

To indicate the correct answer, draw a line under it, check it, or fill in the blank with the right word or words.

1. Water which is at rest may be set in motion by heating a portion of it, causing convection currents of water due to unequal temperature. .... TRUE FALSE
2. Convection currents of air may also be produced by unequal temperatures. .... TRUE FALSE
3. By heating air, its density is increased. .... TRUE FALSE
4. Warm air tends to rise because it is displaced by heavier cold air. .... TRUE FALSE
5. The rotation of the earth deflects the direction of convection currents of air. .... TRUE FALSE

The greatest heating of the air will take place near the (6) .... because at that location the sun's rays are more nearly (7) .... to the earth's surface.

The speed of the rotation of the earth at the equator is approximately (8) .... miles per hour; at a point 30° north or south latitude it is approximately (9) .... miles per hour.

The deflection of air currents as they move toward the poles is the result of the variations in the speed at which the surface of the earth is moving in space, therefore, the deflecting force is greatest at the (10) .... and zero at the (11) ....

High altitude convection currents—cold, dry and dense—proceed from the equator toward the poles; due to rotation of the earth, they spiral to the

(12) .... in the northern hemisphere and to the (13) .... in the southern hemisphere. Etc.[32]

Evaluation of the learning resulting from viewing teaching films is an essential step in any plan for the effective use of films in the classroom. It shows to what extent learning has been accomplished, and it can specifically define individual progress and individual needs for further work on the subject being studied.

6. *Provide for follow-up activities which develop naturally out of film viewing and are pupil-teacher planned.*

If the viewing of a carefully selected teaching film is a means of acquiring background or readiness experience, this film viewing can become the basis for countless follow-up activities in written expression, oral communication, art, number activity, project work, etc. These activities may cover a wide range, depending on pupil interest and ability, but teacher and pupil should plan them together.

After the film *Desert Nomads* (Sound, B&W, 22 min., United World) was shown to intermediate-grade pupils, the following planning took place:

TEACHER. Did we find answers to all our questions?
GIRL. I wanted to find out more about the foods they were preparing.
TEACHER. What did you discover?
GIRL. I found out how couscous is made [ground barley steamed over lamb broth], but the film showed they were eating other things, too.
TEACHER. If you're really interested in finding out about other "dishes" they prepare, what could you do about it?
GIRL. I could read books about it.
TEACHER. Yes, but are you going to be satisfied with just reading about their food?
GIRL. Could we make some of their dishes?
TEACHER. Not very well right here—but—who has an idea?
GIRL. I think Miss Weltin [Home Economics teacher] would let us try some recipes.
TEACHER. Where will you get the recipes?
GIRL. Maybe she has some, maybe the librarian would help us. . . .
TEACHER. Would you like to try? (*Eleanor responds enthusiastically.*)
TEACHER (*continues*). I'd like to have you try, Eleanor. Is anyone else interested? (*Several hands appear.*) Martha, Ruth, Geraldine and . . . O.K.,

[32] Visual Learning Guide for *Modern Weather*, National Audio-Visual Council, Chicago.

Bob, you can join the group. Now you get together over there with Eleanor, she's your chairman, and plan exactly what you'd like to do. . . .[23]

Within a few days some interesting North African dishes were tried out in the Home Economics room.

Other groups did some simple reading research before constructing a "table-top oasis." Free reading practically exhausted the library shelf of stories laid in desert regions, and descriptive accounts of desert areas, living conditions, and geography were eagerly sought.

A group interested in art worked their study information into a collective mural. Requests went to the music teacher to spend part of the hour on folk music of North Africa. A poem which one of the children found was adapted to choral speaking: and the blank space on the bulletin board was covered with pictures and news clippings, all pupil-arranged.

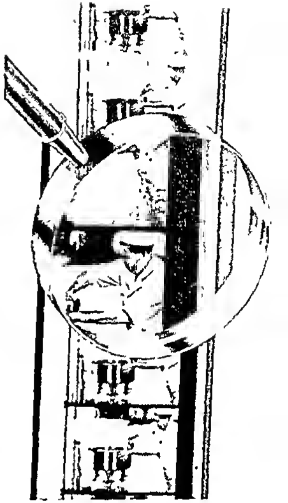


Fig. 13 24. Half of the sound track here is used to carry a magnetic "track." On this track pupils or teacher may record their own narration.

In a senior English class the viewing of the *Great Americans* series, which includes *Franklin* (Sound, B&W, 16 min., EBF), *Longfellow* (Sound, B&W, 16 min., EBF), *Alcott* (Sound, B&W, 16 min., EBF), *Cooper* (Sound, B&W, 16 min., EBF), *Jefferson* (Sound, B&W, 16 min., EBF), and others, led to a class-planned essay assignment, to "If they were alive today" radio interviews, reports on the independent reading of "works" not in textbook anthologies, and original "television" dramatizations of interesting episodes in the lives of these great Americans.

Films which show how-to-do-it procedures invariably result in the formation of groups headed toward creative efforts. Following the show-

[23] Recorded classroom experience of one of the present authors.

ing of a film explaining the preservation of milk in cheese form, the intermediate-graders interviewed store managers, dairy men, and druggists until they had the information they wanted. They then proceeded to test their information and make their own cheese.

After their study of housing, a junior-high-school group located specific films on brickmaking and concrete construction, and then located and assembled the actual materials necessary for what they finally accomplished, the making of crude but durable bricks.

Other follow-up activities growing out of viewing films include:

Film	Activity
Shy Guy, Sound, B&W, 13 min., Coronet.	Organizing a school "Welcome New Pupil" club.
Decimals Are Easy, Sound, B&W, 10 min., Coronet.	Interviewing local merchants about the use of fractions and percentages in business.
Language of Graphs, Sound, B&W, 15 min., Coronet.	Production of graphs and charts on the high-school activity budget, school team record, etc.
Maps and Their Meaning, Sound, Color, 15 min., Academy.	Construction of a terrain model of the local county.
Fundamentals of Acoustics, Sound, B&W, 11 min., EBF.	Testing the classroom and applying low-cost acoustic materials to ceiling and back wall.

The strength of the teaching film lies in its graphic portrayals. Film-inspired pupil activity is a natural outgrowth of viewing teaching films. Unless provision is made for follow-up activity intelligently planned by teacher and pupils, one of the greatest values of using educational sound films in the classroom will be lost.

THE MAGNETIC SOUND FILM PROJECTOR

A new device, the magnetic sound film projector, is actually a combination 16 mm. sound motion-picture projector and tape recorder. This magnetic film projector permits two kinds of use: (1) The teacher may record voice or sound on a commercially produced sound film, or (2) he may add voice or sound to a silent film.

The first step in recording on a sound film is to send the film to a laboratory to have it "sound striped." This is done by painting a thin

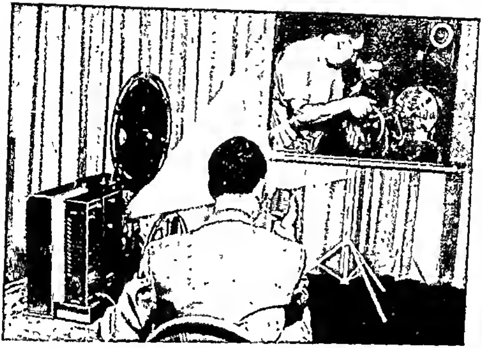


Fig. 13.25 Magnetic sound equipment enables the teacher either to use the existing sound track or to record his own.

stripe of magnetic material on half or all of the sound track. This creates a narrow recording strip on the film.

The teacher then records his own words or useful sound effects on the film with the magnetic recorder in much the same way as he would use a tape recorder. If the film has been half-striped, he can play back either the sound effects he recorded or, by flipping the proper switch, the original sound track. Thus a history teacher can record his own interpretation of a film, a geography teacher may change the vocabulary level of the original film.

In another use, athletic events, plays, school events, etc., may be photographed with a motion-picture camera, the resulting silent film then sound striped, and explanations supplied by the coach, principal, or teacher recorded by means of the magnetic sound film projector.

SUMMARY

The 16 mm. motion-picture film offers many opportunities for the improvement of instruction. Through basic motion-picture techniques such

TEACHING

A film can show { SKILLS / ACTION / BACKGROUND INFORMATION / FACTS

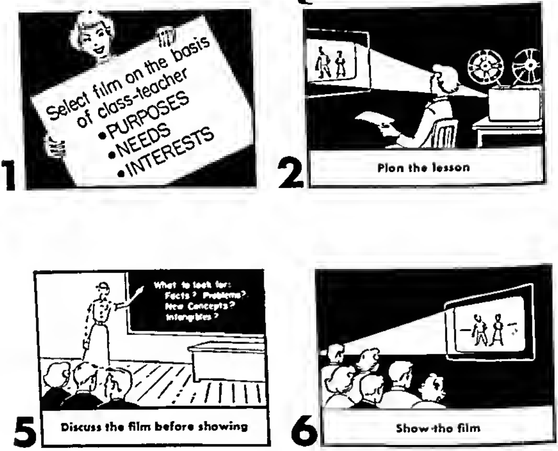
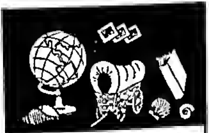


Fig. 13.26.

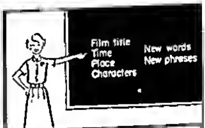
as direct photography, changing-speed photography, photomicrography, and animation, great areas of desirable but heretofore inaccessible instructional experiences and visualized explanations can now be brought into any classroom.

with a FILM

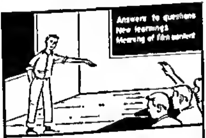
A film can also { BUILD ATTITUDES / STIMULATE EMOTIONS / DEVELOP PROBLEMS



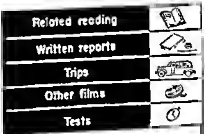
3 Make use of other materials



4 Tell class about the film



7 Discuss the film after showing



8 Engage in follow - up activities

Two broad types of sound motion-picture films are being used in classroom work: (1) the basic teaching film and (2) the supplementary teaching film. The latter, while produced for other purposes, is often useful in instructional situations.

The classroom use of teaching films has revealed many va

THE 16 MM SO

AUDI FILM

interest is heightened, more learning is accomplished, the retention of learned material is more permanent, and interest in reading is increased.

The teacher who uses films in the classroom must accept new and increased responsibility if they are to be used with greatest effectiveness.

It is the teacher's responsibility to choose wisely from large numbers of teaching films those which will make the greatest contribution to the classroom situation he seeks to create. In selecting, he must consider such characteristics as authenticity, grade level, curriculum purpose, quality of photography and sound, organization, and study helps.

The greatest responsibility is incurred when the teacher actually prepares to use the film in the classroom. The film should never be accepted as a mechanical substitute for good teaching. Rather, a carefully selected teaching film is a tool of instruction which, wisely used, can bring results in terms of interest, learning, and pupil activity far beyond those heretofore accomplished with traditional learning materials.

Other teacher responsibilities for using films in the classroom include awakening pupil interest and the desire to learn, conducting vocabulary study before the film is shown, planning with the pupils their purpose in seeing films, providing good classroom conditions for film viewing, and providing for pupil and group evaluation and for follow-up activities that are planned with the pupils.

In the hands of an intelligent, well-trained, and understanding teacher, the teaching film can be a vivid, interesting, dynamic, and socially useful instrument of instruction.

Suggested Activities

1. Refer to the diagrams in this chapter on the motion-picture projector, sound recording and reproduction. Use them to help explain:
   a. How the simple action of walking across the room is photographed by the motion-picture camera.
   b. How the above simple action (or any other one you may choose) is projected on the screen so that the illusion of motion is created in the mind of the viewer. Why is this illusion created?
   c. How sound is recorded on the film. How sound is reproduced from film.
   d. How and why almost all sound motion-picture projectors (except the magnetic) are basically alike.
2. Learn to operate as many kinds of 16 mm. sound motion-picture projectors

as are available for class use. View the film *Projecting Motion Pictures* (Sound, B&W, 18 min., University of California at Los Angeles), and discuss good room arrangements and projection techniques.

3. View films which explain the usefulness of films in instruction, such as:
   a. *Facts About Film*, Sound, B&W, 9 min., International Film Bureau.
   b. *Facts About Projection*, Sound, B&W, 10 min., International Film Bureau.
   c. *Film Research and Learning*, Sound, B&W, 15 min., Teaching Materials Service, Beloit, Wis.
   d. *Instructional Films, the New Way to Greater Education*, Sound, B&W, 25 min., Coronet.
   e. *Making Films That Teach*, Sound, B&W (and color), 25 min., EBF.
   f. *Operation and Care of the Bell & Howell Sound Projector*, Sound, B&W, 22 min., International Film Bureau.
   g. *Operation and Care of the RCA Projector*, Sound, B&W, 18 min., International Film Bureau.
   h. *Projecting Motion Pictures*, Sound, B&W, 9 min, UCLA.
   i. *Using the Classroom Film*, Sound, B&W, 22 min, EBF.
4. In terms of your own subject-matter interests, select a film and plan for its effective use in a teaching situation. Note the responsibilities the teacher accepts when using a film in the classroom, and keep them in mind as you make your plan.
5. Arrange to put your plan into use. Either as a teacher in your own classroom or as a student teacher in a "practice classroom," introduce, project, evaluate, plan for, and guide the follow-up activities for your film.
6. Keep a diary of the pupil reactions, questions, and outcomes you note while the film lesson continues. At the completion of the lesson, consult this diary and evaluate your success or oversights in terms of the above responsibilities.
7. Following this self-evaluation, select another film and plan to use it in the classroom. Afterward, record results and again evaluate your effectiveness in teaching with films.
8. Preview many sound motion pictures. Secure the films from such sources as a teachers college or university film library, public-school audio-visual director, public library, local representatives of industry, county agent, county medical officer, Red Cross office, local commercial film dealer, etc. After previewing the films:
   a. Classify them as basic or supplementary (subdivide the latter).
   b. Locate, project, and discuss the educational significance of the portions of these films which employ direct photography, changed-speed photography, photomicrography, and animation.
   c. Judge the effectiveness of these films in terms of the criteria in the film selection guide on page 401.

d. Keep records of your previewing. These records will help you become aware of and conversant with the "literature" of teaching films. You will want to refer to these records in searching for effective teaching material that will be useful for specific units of work.

Here are some suggested films:

Primary Grade Films

Adventures of Bunny Rabbit, Sound, B&W, 11 min., EBF.
Animal Neighbors, Sound, Color, 10 min., Coronet.
Baby Animals, Sound, B&W, 8 min., YA.
Blow, Wind, Blow, Sound, B&W, 10 min., Coronet.
Circus Animals, Sound, Color, 10 min., Academy.
Flipper the Seal, Sound, B&W, 10 min., Coronet.
Hare and the Tortoise, Sound, B&W, 11 min., EBF.
Live Teddy (Koala) Bears, Sound, B&W, 11 min., EBF.
Red Hen, Sound, Color, 10 min., Barr.
Safety to and from School, Sound, B&W, 10 min., YA.
Spring on the Farm, Sound, Color, 10 min., EBF.
Wonders in Your Own Backyard, Sound, Color, 10 min., Churchill-Wexler.

Intermediate Grade Films

Arithmetic

How to Subtract Fractions, Sound, B&W, 11 min., Johnson-Hunt.
Meaning of Long Division, Sound, B&W, 10 min., EBF.
Meaning of Percentage, Sound, B&W, 10 min., YA.
Multiplication Is Easy, Sound, B&W, 11 min., Coronet.
Origin of Mathematics, Sound, B&W, 10 min., United World.
Using the Bank, Sound, B&W, 10 min., EBF.

Language Arts

Alcott, Louisa May, Sound, B&W, 16 min., EBF.
Holmes, Oliver Wendell, Sound, B&W, 16 min., EBF.
How to Observe, Sound, B&W, 10 min., Coronet.
Longfellow, Henry Wadsworth, Sound, B&W, 16 min., EBF.
Punctuation—Mark Your Meaning, Sound, B&W, 10 min., Coronet.
Treasure Island, Sound, B&W, 44 min., TFC.

Natural Science

African Fauna, Sound, Color, 11 min., Hoefler.
Birds of the Dooryards, Sound, Color, 11 min., Coronet.
Camouflage in Nature Through Form and Color Matching, Sound, Color, 10 min., Coronet.
Flowers at Work, Sound, B&W, 10 min., EBF.
Honeybee, Sound, B&W, 11 min., EBF.
Magnets, Sound, B&W, 10 min., YA.
Monarch Butterfly Story, Sound, Color, 10 min., EBF.
What Is Sound? Sound, B&W, 11 min., YA.

Social Studies

Desert Nomads, Sound, B&W, 22 min., United World.

Farmers of India (Middle Ganges Valley), Sound, B&W, 22 min., United World.

Maps and Their Meaning—Land Symbols, Sound, Color, 15 min., Academy.

Norwegian Children, Sound, B&W, 11 min., EBF.

On Mediterranean Shores, Sound, B&W, 22 min., United World.

Pilgrims, Sound, B&W, 22 min., EBF.

Pioneers of the Plains, Sound, B&W, 10 min., EBF.

Sampan Family, Sound, B&W, 16 min., International Film Foundation.

High-School Level Films

English

David Copperfield: The Boy, Sound, B&W, 42 min., TFC.

France: Background of Literature, Sound, B&W, 11 min., Coronet.

How to Study, Sound, Color, 10 min., Coronet.

Irving, Washington, Sound, B&W, 18 min., EBF.

New England: Background of Literature, Sound, B&W, 10 min., Coronet.

Scotland—Background of Literature, Sound, B&W, 10 min., Coronet.

Shakespeare, William, Sound, B&W, 25 min., EBF.

Whittier, John Greenleaf, Sound, B&W, 16 min., EBF.

Guidance

Act Your Age, Sound, B&W, 13 min., Coronet.

Counseling—Its Tools and Techniques, Sound, B&W, 20 min., VCF.

Family Circles, Sound, B&W, 29 min., McGraw-Hill.

Marriage for Moderns Series, Sound, B&W, 5 films, approx. 20 min. each, McGraw-Hill.

More Dates for Kay, Sound, B&W, 9 min., Coronet.

Health and Physiology

Alcohol and the Human Body, Sound, B&W, 14 min., EBF.

Biology of the Unborn, Sound, B&W, 20 min., EBF.

Body Care and Grooming, Sound, B&W, 17 min., McGraw-Hill.

Ear and Hearing, Sound, B&W, 10 min., EBF.

Emotional Health, Sound, B&W, 21 min., McGraw-Hill.

Growing Girls, Sound, B&W, 10 min., EBF.

Human Growth, Sound, Color, 19 min., Univ. of Oregon.

Skeleton, Sound, B&W, 11 min., EBF.

Your Voice, Sound, B&W, 10 min., EBF.

Home Economics

Child Care and Development, Sound, B&W, 17 min., McGraw-Hill.

Cooking Series, Sound, B&W, 39 min., YA.

Foods and Nutrition, Sound, B&W, 11 min., EBF.

Sewing Films, Sound, B&W, 40 min., YA.

Wise Buying, Sound, B&W, 10 min., Coronet.

Your Family Budget, Sound, B&W, 10 min., Coronet.

Mathematics

A Plus B Squared, Sound, B&W, 11 min., International Film Bureau.

How to Find the Answer, Sound, B&W, 10 min., Coronet.

Language of Graphs, Sound, B&W, 10 min., Coronet.

Language of Mathematics, Sound, B&W, 10 min., Coronet.

Your Thrift Habits, Sound, B&W, 10 min., Coronet.

Music

Beethoven Sonata, Sound, B&W, 18 min., BIS.

Emanuel Feuermann, Sound, B&W, 11 min., Library Films.

Instruments of the Orchestra, Sound, B&W, 22 min., Eastin.

Magic Fire Spell, Sound, Color, 9 min., Clune.

Marian Anderson, Sound, B&W, 26 min., World Artists.

Symphony Orchestra, Sound, B&W, 10 min., EBF.

Trumpet (The), Sound, B&W, 26 min., Budolph Polk.

Science

Alcohol and the Human Body, Sound, B&W, 14 min., EBF.

Gift of Green, Sound, Color, 10 min., Sugar Information, Inc.

How We Get Our Power, Sound, B&W, 11 min., YA.

Safety in the Chemistry Laboratory, Sound, B&W, 15 min., Indiana Univ.

Waves in a String, Sound, B&W, 5 min., McGraw-Hill.

Social Studies

A Citizen Participates, Sound, Color, 26 min., YA.

Bill of Rights of the United States, Sound, Color, 18 min., EBF.

Constitution of the United States, Sound, Color, 22 min., EBF.

Declaration of Independence by the Colonies, Sound, Color, 19 min., EBF.

Defining Democracy, Sound, B&W, 19 min., EBF.

Franklin, Benjamin, Sound, B&W, 16 min., EBF.

Jefferson, Thomas, Sound, B&W, 16 min., EBF.

Productivity—Key to Plenty, Sound, B&W, 20 min., EBF.

Tuesday in November, Sound, B&W, 18 min., OWI—Castle.

World Without End, Sound, B&W, 45 min., Brandon-UNESCO.

Speech

Improve Your Pronunciation, Sound, B&W, 10 min., Coronet.

Parliamentary Procedures in Action, Sound, B&W, 14 min., Coronet.

Speech: Function of Gestures, Sound, B&W, 10 min., YA.

Speech: Platform Posture and Appearance, Sound, B&W, 10 min., YA.

Speech: Using Your Voice, Sound, B&W, 10 min., YA.

Your Voice, Sound, B&W, 10 min., EBF.

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14.

Television in Education

TIME—ANY EVENING AFTER DUSK.

You enter almost any living room, that is, any living room in the 36,000,000 American homes equipped with television receivers today, and what will you probably find? Most of the family—well, the children anyhow—lost in what they are seeing on the television screen.

The statistics tell you that the number of hours children spend "glued"

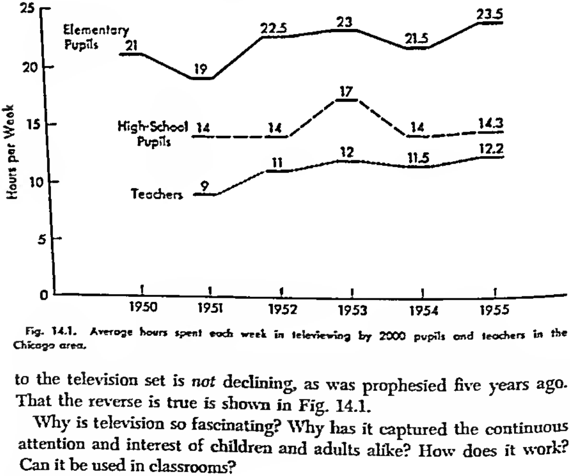

Fig. 14.1. Average hours spent each week in televiewing by 2000 pupils and teachers in the Chicago area.

to the television set is *not* declining, as was prophesied five years ago. That the reverse is true is shown in Fig. 14.1.

Why is television so fascinating? Why has it captured the continuous attention and interest of children and adults alike? How does it work? Can it be used in classrooms?

TELEVISION—AN AUDIO-VISUAL SYNTHESIS

"When I first began to work in television programing," a midwestern educational television producer said, "I found myself producing what I now call *pictures of radio programs*—we 'took pictures' of people talking into a microphone.

"Today, I think of television as a tremendous carrier wave for all or any of the things we associate with the audio-visual field. On any one television program we may find use for short lengths of motion-picture film, charts and diagrams, verbal descriptions, chalkboard illustrations, slides, short segments of tape recordings—every audio-visual device which at a given place in the program will 'get the idea across best' to the viewer."

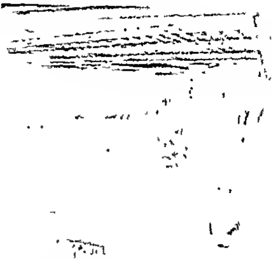

Fig. 14.2. History, as it is being made at this United Nations Conference, may be seen and heard in classrooms within the reception area.

When we consider the interest-inciting results possible when teachers and producers plan how best to communicate ideas by using the most appropriate audio-visual technique, we begin to understand the teaching and learning potentialities of television.

Another factor is its timeliness.

For the first time in history we can be eyewitnesses to events that occur *now, anywhere* within the range of the television camera—the launching of the first atom-powered aircraft carrier, the opening of the spillway of a great dam, the passage of the first ocean vessel through the St. Lawrence Waterway, the arrival of the first transcontinental mail rockets.

Master teachers can televise their expert demonstrations, their object-lesson explanations of grammar or arithmetic, their handcraft techniques, their descriptions of foreign cultures and people. Television is a means of bringing enrichment experiences into the classroom.

As teachers, we should understand the great hold television has on our young people, and we should also realize its potential strengths and

the apparent danger of its reducing viewers to a passive, dream-world identification with what is all too often provided by television entertainment today.

To understand the role of television in the contemporary social scene, it is well to begin by gaining at least a rudimentary understanding of it as an electronic device.

HOW TELEVISION WORKS

Television is a means of converting a scene into an electronic image. This image is sent through space, picked up on an antenna, and translated into a duplicate of the original scene on the surface of a picture tube or, to use the correct name, kinescope.

ANALOGY WITH THE HUMAN EYE

The television process is remarkably similar to the visual process of the human eye. Light waves reflected from an object strike the lens of the eyeball, which focuses these waves onto the retina as an image of the object seen (Fig. 14.3). So with the television camera or "eye"—it too moves and focuses.

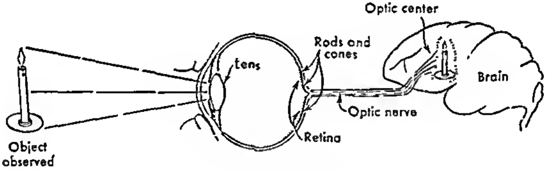

Fig. 14.3. How the eye functions.

The retina contains myriad nerve endings which are sensitive to light and which "record" each tiny portion of the image that falls on the retina. Similarly there are thousands of tiny light-sensitive "nerve endings" on the television camera "retina" or plate. These react to the strong and weak light areas in the image received.

In the human eye, the optic nerve carries the light signals from the thousands of retinal nerve endings to the brain, where the "picture" of the object being viewed is perceived. In the television camera, minute

electric currents are "swept" off the surface of the light-sensitive "retina" by a scanning beam and carried in sequence over a signal beam which is telecast to the "mind" or picture tube. These signals are re-created on the end surface of the picture tube as the original scene "observed" by the television camera.

LIGHT, ELECTRONS, AND LIGHT

Scientifically, television cannot be described except electronically. It is a mechanical-electrical means of converting light patterns into electric impulses and then into light patterns. These changes must occur so rapidly and so continuously that the human eye continues to see after all of them have taken place.

As in the motion-picture film, so in television; a scene appears, disappears, and is replaced by another still scene many times each second. Thirty complete images appear on the camera plate, and therefore on the kinescope tube, every second, this is rapid enough to give the viewer a mental impression of motion. (See persistence of retinal impression, page 364.)

How pictures are televised is shown in the schematic drawing in Fig. 14.4, which shows a television camera, amplifier, transmitter tower, antenna, and picture tube or kinescope.

Sound and pictures are sent over the air simultaneously by means of radio. A camera tube records light patterns and changes them into electrical impulses by means of a plate (*P*) which, covered with hundreds of tiny chemical eyes, is very sensitive to light. The lens of the camera focuses the picture to be televised onto the surface of the plate. Since all the picture images are combinations of lighter and darker areas, the plate changes the light striking its surface into corresponding electrical charges, which are then sent to the target (*T*).

The charges are swept off the target in single file by a scanning or "sweeping" beam (*EB*); hence the whole picture is not sent out or telecast at once. Rather, the beam sweeps back and forth across the target and travels in an interrupted descending path from top to bottom of it, creating a continuous signal or message. The scanning beam sweeps the signals at the rate of 4,000,000 per second, fast enough for 30 complete images to be swept from the camera target every second. This signal is then strengthened or amplified (*AMP*) and transmitted into space.

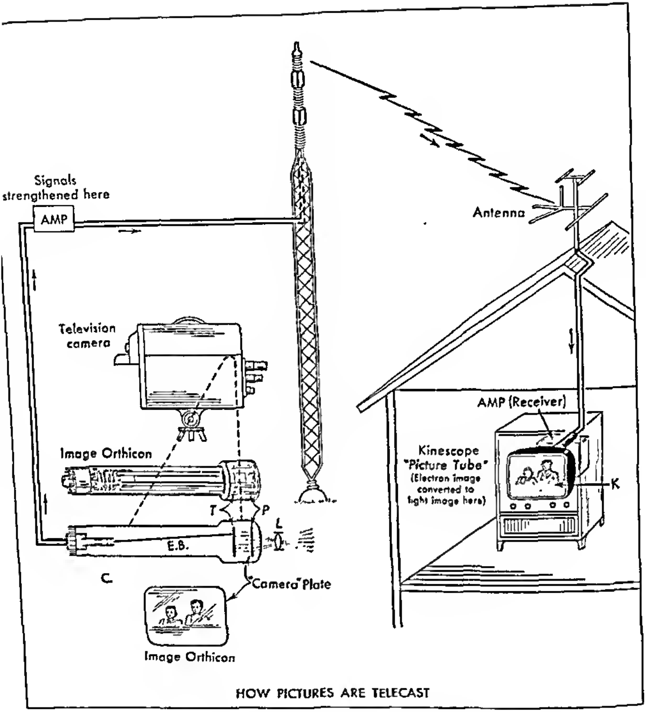

Fig. 14.4. Diagrammatic explanation of television; the sequence of action begins at the lower left.

The reverse process occurs in the picture tube or kinescope (K). When the signals are intercepted by the receiving antenna they are led to a receiver (REC), where they are selected or tuned, amplified (AMP), and then led to the small end of the kinescope. In the same order in

which these charges were swept off the camera target, they are instantaneously scanned or sprayed onto the inside surface of the large flat end of the kinescope. This end of the tube is coated with a chemical like that used in fluorescent lights, which is sensitive to electrical charges. As the electrical energy variations are "sprayed" against the kinescope, they are transformed into light that varies in proportion to the strength of the corresponding charges. Since these electrical charges strike the kinescope screen in the same order as that in which they were swept off the camera target, an identical picture image is reproduced. This process occurs at the same rate—4,000,000 impulses and 30 complete pictures per second.

TELEVISION AS A MEANS OF INSTRUCTION

As early as 1951 Franklin Dunham reported that 56 colleges and universities, 4 medical schools, 19 public schools, and 2 public libraries

Fig. 14.5. Over channels set aside for educational television, these 23 stations are now *telecasting* regularly scheduled programs.

were producing television programs.[1] In almost every case these programs were televised over commercial stations.

[1] Franklin Dunham, "Educational Institutions and Systems Render Public Service Through Television," *Higher Education*, April 1, 1951, p. 175.

Since 1952, television channels for school purposes have been made available by the Federal Communications Commission. Many of these channels are being used today to originate or rebroadcast programs specifically produced for educational television. These educational television stations, however, reach only a fraction of our schools. Many schools must depend on commercial television for occasional useful programs, and many other schools are entirely outside the range of any television station.

The following three types of television programs are useful in classroom work:

1. Those produced for the general public but applicable to school situations.
2. Those planned and produced by school authorities for regular classroom use.
3. Those of such recognized worth that they are made into kinescope recordings.

PUBLIC TELEVISION IN THE SCHOOL

When is a television program entertainment? When is a program which has been designed for general consumption useful in the classroom?

The greatest single consideration in selecting any instructional material for school use is whether it presents an additional desirable learning experience. This must be determined by those who examine television programs originally produced for other than school use. (See the film selection guide on page 401.)

Many valuable programs are televised during school hours. If the teacher makes it his responsibility to know about them in advance of the class period, if he selects programs which are useful in connection with the subject currently being studied, he can provide his pupils with added experience with their world.

Telecast weather reports are verbal explanations supported by weather charts showing thermal zones, storm fronts, isobars, and pressure zones. What better demonstration is available for science classes studying the atmosphere and weather?

Weekday telecasts of classical and contemporary music, during which the cameras move around above the various performers, allow the viewer

to watch the fingers of the first violinist, observe the trumpeter as he delicately fingers the keys of his instrument, watch the tympanist produce a crashing crescendo. Is this an experience for adults only? Or is it a model of hoped-for attainment to be shown to instrumental music classes in the junior high school?

The tele-lanes are crowded with cooking and sewing demonstrations, but every so often an expert chef or a highly skilled dress designer will demonstrate a technique of his art which cannot help but be an effective supplement to the more routine courses of study in home economics. Such programs should be used in the classroom.

The wealth of current events telecasts is beyond description—Congress in session, United Nations proceedings, the city fathers in action, illustrated reports by the sanitary engineer, the superintendent of water supply, and public works construction engineers. All of these should be scrutinized by the history and social studies teacher who seeks to relate contemporary living with the individual student's understanding of his role in society.

The existing general television programs, if carefully selected for their ability to bring added and desirable experiences into learning situations, represent a valuable entry to the field of educational television for those who are interested in the possibility of improving instruction through this medium and who have access to television receivers that are large enough to permit good viewing in the classroom.

SCHOOL-PLANNED TELEVISION PROGRAMS

As early as 1947, a beginning in school-planned television programs was being made in the United States. Such programs varied from quasi-school telecasts planned largely by network systems, to programs that were planned and produced by the school itself. The "All New York Junior-High-School Television Quiz Tournament" (Fig. 14.6), planned and produced by a New York City network and the Board of Education, was an example.[2]

Today television—school planned, produced, and broadcast—is a reality, particularly in the centers of heavy population. Grants-in-aid from foundations, local citizen fund-raising activities, and school board budget

[2] Edward Stasheff, "Television Adjunct to Present Visual Materials in Public Education," *See and Hear*, November, 1947, p. 23.

Fig. 14.6. Pupils from many junior high schools participated in this quasi-educational telecast.

allocations, in combination, have made educational television very much a part of regular classroom work in schools in many cities. (See Fig. 14.5.)

The best school television programs are found where the school personnel has complete control over planning, producing, and broadcasting. This is the situation in Philadelphia, and the result is a classroom television schedule that is seen by over 100,000 pupils each week. Since 1952, the planning and production of television programs for the classroom have been in the hands of qualified and experienced teachers working directly with the curriculum office and special subjects divisions. Well in advance of each telecast, a copy of the program schedule and its content is sent to all the teachers so that they may prepare their pupils to use the televised experiences more effectively. Principals, teachers, and parents are encouraged to suggest topics for the programs. After

Fig. 147. As principals and teachers in Philadelphia develop unusual instructional techniques, the best of these are televised so that others may share them. How is this likely to influence classroom teaching procedures?

the programs are telecast, evaluation reports are submitted by teachers who have used the programs, and their suggestions are used whenever feasible.

Television in Philadelphia has brought into the classroom many enrichment experiences which ordinarily would not be available. Examples are *"R" for Rhythm*, which presents creative ideas for teaching music to elementary-school children; *Exploring the Fine Arts*, in which outstanding people, both local and from other places, describe their own ideas about sculpture, ballet, painting, music, and drama, all toward the end of bringing useful community resources into every classroom; *The World at Your Door*, in which high-school pupils interview guests from foreign places and look at films, photographs, and art work typical of each guest's own country.

Fig. 14 8. May it be possible for one highly skilled teacher to devise television teaching methods which will enable thousands of children in distant classrooms to acquire needed skills and mastery of a subject—in this case, Spanish?

In other programs, exceptionally qualified teachers present their ideas and skills in relation to the day-to-day curriculum content in science, physical education, civics, arithmetic, or reading.

The story in St. Louis is similar. An educational television station has been established with funds from school board appropriations, a foundation grant, and popular subscription. A staff of persons experienced in the audio-visual field is in charge of producing television for classroom use.

In addition, classroom television is the subject of research. One study investigates television as a means of using a few highly competent teachers to instruct large numbers of school children in the tool subjects. This is a departure from television's usual role—enrichment. For example, one teacher teaches second-grade spelling via television to large groups of children in many schools. The question here is: Can spelling

Fig. 14.9. What is happening in education is reported regularly over the Los Angeles *Spotlight on Youth* television program. What purposes are served by presenting this ceramics class?

be taught to hundreds of children by television as effectively as it is usually taught?

Other research studies that are planned relate to this technique with other tool subjects—English and grammar, arithmetic, reading, etc.—to be used with pupils in an area ranging from 20 to 50 miles, the usual radius of a school television station.

The role of educational television in enriching classroom experience is well established. Its role as a central "master teacher" is under honest scrutiny, and much time and study will be needed to test the idea. Meanwhile, educational television in St. Louis is continuing an enrichment program which presents such programs as *Let's Make Music*, *Modern U.S.A.*, *The Story Teller*, and *Eins Zwei Drei* (German).

In other cities basically similar educational television enrichment programs are being shown. In Pittsburgh, hobby programs, story hours, a music hour for pre-school children, a pet program are televised over an educational television station to both school and home. In Chicago lay people and schools have joined forces to establish an educational tele-

Fig. 14.10. These pupils are to demonstrate their activity in American history to schoolmates and parents via television.

vision station for school children and adults. Commercial stations in Los Angeles encourage schools to produce, as a public service, programs which inform the community about school activities. Denver, San Francisco, Cincinnati, and Houston are other communities where educational television is a reality today.

As is the case with all instructional materials, problems confront the successful use of television in school. Program time schedules have to be reconciled. Duplications and programs with one-sided emphasis of content have to be avoided through careful planning. School television sometimes merely duplicates the contribution of other audio-visual materials and techniques.

KINESCOPES (RECORDED TELEVISION) AND TELEFILMS

A radio program that is worth preserving for replaying, relistening, or rebroadcast can be transcribed on tape. (See Chapter 10.) Similarly, a television program that is worth "saving" or "recording" can be preserved in both visual and audio form by kine-photography. Kine-photography is a means of making a continuous sound and motion-picture record of a

television show while it is being telecast. A kine-photographic record of a television program is in essence a sound motion-picture film.

A kinescope recording is mounted on a 16 mm. motion-picture reel, is 16 mm. wide, has a sound track along one edge, and may be projected on a standard 16 mm. motion-picture sound projector. It differs only in that it is actually a recording of a live television program. As such, kinescopes are a rich new source of supplementary classroom experiences.

Kinescopes can be obtained from two major sources: (1) as rebroadcasts by educational television stations, and in some cases commercial stations; and (2) by purchase from television or film companies, or by renting from educational motion-picture film libraries.

Another new development in television production is the telefilm, a sound motion-picture film that is made specifically for television programs. Some telefilms are valuable for use as educational motion-picture films. Telefilms are only now being made available for school use and may be obtained from the same sources that supply educational sound motion-picture films.

Fig. 14.11. A graduate student at the University of Wisconsin created a fascinating television program for children. Now over 130 of his Friendly Giant programs have been kinescoped for use by other educational television stations and for use as films in classrooms and libraries.

Rebroadcast Kinescopes

The agency most interested in sponsoring educational television and kinescopes is the Educational Television and Radio Center, established in 1954 by the Fund for Adult Education of the Ford Foundation. Its function is to arrange for the best educational television programs to be kinescoped when they are originally televised, and to distribute these kinescopes to educational televi-

sion stations for inclusion in local telecasts to the community as well as to schools. It also secures rights to existing films and distributes these films to educational television stations. It has now begun to secure kinescopes of the best educational television programs produced in other countries and to send kinescopes of American television programs abroad in return.[3]

Fig. 14.12. The Boston Tea Party was produced as a telefilm, then televised nationally. How is this development affecting classroom teaching?

Producers of educational television programs report that usually a local staff is not capable of producing the number of programs required for local television schedules that run from three to six hours every day. Hence such a kinescope service as that provided by the Center is greatly needed as a means of bringing to schools what can be justly described as socially useful educational television.[4]

Purchased or Rented Kinescopes and Telefilms

The kinescoped television program is a newcomer to the field of audio-visual materials which should be considered by all teachers, particularly those who teach in areas where there is no television.

One of the first kinescopes available for school use was produced in 1951 during the Kefauver Committee investigation of crime in major American cities. The Kefauver kinescopes are actually documentary film accounts highly useful in civics classrooms as background material to the study of court procedures and crime in large cities.

An outstanding series of American history telefilms has been created under the series title of *You Are There* (Fig. 14.12). These programs were originally produced as a nation-wide Sunday afternoon television network program. Before each broadcast CBS prepared and mailed study

[3] *Emphasizing Educational Television,* Educational Television and Radio Center, Ann Arbor, 1956.

[4] *Presenting National Educational Television,* Educational Television and Radio Center, Ann Arbor, 1956.

guides to teachers in 10,000 schools. These television study guides began as follows:

> "Television Teaching Aids" are designed to assist the secondary classroom teacher in meeting the needs and interests of students who view the CBS-TV documentary show, *You Are There*. Their content aims to provide teachers with materials supplementary to the basic course of study in the social studies, communications and other curricula. The suggested activities and bibliography may be used and adapted by teachers to fit their own needs.

These telefilm programs[5] are now being sold to educational film libraries throughout the country, and descriptive entries of them appear in educational film catalogues.

In 1956 the Educational Television and Radio Center selected several series to be released as kinescopes for use in schools. Included are *Understanding Numbers*, a series of 30-minute black-and-white kinescopes which deal with the uses of numbers and number systems; *Talking Sense*, which promotes more effective speech habits; and *The Friendly Giant*, which describes visits to the castle of a "friendly Giant."

CLASSROOM USE OF TELEVISION, KINESCOPES, AND TELEFILMS

The use of television, kinescopes, and telefilms in the classroom closely parallels the use of the sound motion-picture film. Nevertheless, there are certain factors that should be considered, particularly in the case of television programs.

TECHNIQUES FOR SELECTION

The selection of a telecast, kinescope, or telefilm suitable for instructional use is similar to the process of evaluating and selecting sound

[5] *You Are There*, a telefilm series on American History including such titles as *The Boston Tea Party*, *The Signing of the Declaration of Independence*, *Washington's Farewell to His Officers*, *The Emancipation Proclamation*, *The Death of Stonewall Jackson*, *Completion of the First Transcontinental Railroad*, *Susan B. Anthony Is Tried for Voting*, *The Hatfield-McCoy Feud*, *Admiral Dewey's Victory at Manila*, *First Flight of the Wright Brothers*, *D-Day*, *The Boston Massacre*, *The Surrender of Cornwallis at Yorktown*, *Eli Whitney Invents the Cotton Gin*, *The Hamilton-Burr Duel*, *Grant and Lee at Appomattox*, *The Secret Message that Plunged America into World War I*, *December 7, 1941*, *The Rescue of American Prisoners at Santo Tomas*.

All are available through Young America Films in New York City, or through local, state, or regional film libraries.

motion-picture films for use in the classroom. (See pages 401–422.)

As in selecting any audio-visual material of instruction, the basic question to be answered is whether the telecast, kinescope, or telefilm makes a contribution to the learning situation beyond that made by instructional materials already in use.

A unique problem that confronts the teacher in evaluating and selecting a telecast is the impossibility of preview. Therefore, judgment must be based to a great extent on previous experience with the program. The reputation of the sponsor or producer, the caliber of the expert, authority, or demonstrator who appears on the program, the care taken in organizing the telecast—all will help the teacher decide regarding the probable usefulness of current telecasts and those that may be produced in the future. In general, the reputation of the producer and participants will be of continuing importance in this connection.

The same considerations regarding curriculum validity and suitability for the grade apply as surely to telecasts, kinescopes, and telefilms as to other audio-visual materials: (1) Is the general level of the program keyed to the age of the group that will see it? (2) Is the content of the telecast of such a nature that it will make for better understanding of the subject? Does the program include useful supplements to the unit of work or the general curriculum area? (Here again, inability to preview necessitates the teacher's knowing the general purposes and content of the television program.)

Finally, the quality of the telecast itself must be evaluated. For example, is the program of high quality? Here also, as the teacher becomes increasingly expert in making judgments about the quality of all kinds of instructional materials, this knowledge will enable him to make sounder judgments of television programs.

THE WISE USE OF TELECASTS

The teacher's responsibility in planning for a telecast in the classroom is closely allied to his responsibilities in planning to use other audio-visual materials such as filmstrips, sound motion-picture films, transcriptions, radio broadcasts, etc.

Before the telecast, the teacher should provide activities which will heighten the pupils' interest, which will motivate. The children should be encouraged to talk about the program and to recognize purposes for

seeing it. They will soon realize their responsibility for following up a television program by applying what they have seen to the whole range of school activities.

The teacher's greatest difficulty in planning to use television programs is, of course, the inability to know the exact content of a program. This will always be true of telecasts of "live" programs. Kinescopes and telefilms, however, can be previewed.

IMPROVING HOME TELEVIEWING STANDARDS

Parents voice both acclaim and concern over the television-viewing habits of their children. The figures cited earlier in this chapter reveal that school children often spend twenty hours a week before the home television receiver screen—nearly as many as the twenty-five hours normally spent each week in classroom work. This situation is no longer the exception but rather the rule as more and more American families acquire television receivers (Fig. 14.14).

Fig 14.13. Among noneducational commercial broadcasts there are programs appropriate for children, such as *Daniel Tiger*, a children's puppet program on Pittsburgh's educational television station.

"What can I do to get my children away from watching television so much?" a parent asks.

"What can we do to get our children to use better judgment in selecting programs?" another says.

Any part of our everyday life which is as important as television home viewing deserves to become part of the school language arts program. Classroom activities should include discussion of the subject and of techniques for selecting better programs. The question of what is best will be interesting.

Typical class discussions about television will establish the frequency with which pupils watch such programs as *Dragnet, I Love Lucy, Topper,*

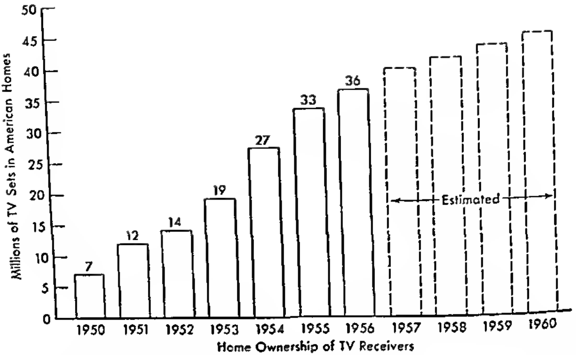

Fig. 14.14. Home ownership of television receivers. All figures are based on 45 million electric power customers; there are 48,509,000 home units in the United States.

I Led Three Lives, and *Gunsmoke.* The wise teacher through discussion and counseling will help upgrade the group's viewing habits from their present standard. Another topic for discussion is the benefits to be gained from television. Certainly fun and baving a good time should be included. But there are other factors that, when diseussed and understood, will influence students toward spending fewer hours watching television and toward seeing the more worth-while programs listed in the local newspaper.

An evaluation sheet such as the following can be used for beginning judgments about home television viewing. Later the class may wish to devise their own.

Name of program .... Network .... Time ....
My estimate: Excellent___|___|___|___|___|___|___ Poor

1. Was the television story worth while? ....
....
....
2. Did the television program contain information which will help me in my daily living? ....
....

3. Did the television program present information which will help me in my school work? ....
....
4. Was the television program well presented? Was it well organized? Did it represent clean fun? Did it present desirable speech and action, etc.? .....
....
....
5. Was the acting well done? ....
....
6. Was the program clear-cut, vivid, and well defined as it came through on my receiver? ....
....
7. Were the costuming and scenery well done? ....
....

Study of local television program schedules will show that while most programs are sponsored, others are broadcast by the station as its own contribution to good entertainment. Usually these sustaining programs are of high quality.

SUMMARY

Television approaches the ultimate in mass communication of ideas. It is a means of converting a scene into an electronic image, and sending that image through space to be received and translated into its original visual form for the benefit of those who wish to see it. As such, television is an amazingly complex phenomenon which is capable of recording, sending, and reconstructing 30 complete pictures per second, which in turn means that 4,000,000 electron impulses are telecast per second.

Television has had a remarkable growth. From a small number of experimental sets in 1946, the year 1956 saw receivers installed in over 36,000,000 homes in less than 20 percent of the land area of the United States, for at that time vast areas of the country were still without television facilities.

As is the case with all communication media, the school has great responsibilities in selecting and using telecasts; in producing television programs by school people, about school subjects, for school use; in instilling better televiewing habits in school children; and finally in providing the necessary television equipment for schools and classrooms so that television programs can become an inherent part of classroom instruction.

Equally important is the responsibility of school administrators and teachers to equip their classrooms with satisfactory television sets. All school systems should be conducting investigations of the possibilities of producing and telecasting useful educational programs.

A new development, the kinescope, makes it possible to record valuable television programs for later use either for broadcast or for classroom presentation. Since kinescopes are in every respect sound motion-picture films they can be used as such in classroom learning situations.

Still another development, the telefilm or sound motion-picture film made expressly for television use, is also of value in the classroom.

Television, kinescopes, and telefilms can and should be added to the array of audio-visual learning materials which enable school children today to become realistically aware of the world environment which they must know about and in which they will live.

Suggested Activities

1. As an individual student or a member of a committee, conduct interviews or a questionnaire study among the students of a local grade school. Obtain information such as the following:
   a. Number of children whose families own television sets.
   b. Time spent each day or each week in televiewing.
   c. Time spent in listening to the radio before and after the family had the television set.
   d. Time spent in reading before and after the television set was installed.
   e. Time spent in going to the movies before and after the television set was installed.
   f. Television programs most frequently watched.
   g. Programs which are forbidden by parents.
   h. Programs which are encouraged by parents.
   i. Changes in sleeping habits since the family bought the television set.

   Prepare a report on your investigation and discuss the implications of your findings. Repeat the study with high-school pupils.
2. Visit the nearest commercial or school telecasting station. Investigate such factors as:
   a. Methods of producing or selecting television programs.
   b. Attitude of program manager toward school telecasting.
   c. Nature of the audience.
   d. Studio facilities.
   e. Physics of telecasting.

3. Visit a classroom in which television is used. Note such aspects of the program being televised as:
   a. Preparation prior to televiewing.
   b. The fixing of pupil goals.
   c. Removal of barriers to understanding the program.
   d. Follow-up discussion and evaluation.
   e. Follow-up activities.
   f. Effect on pupil interest and initiative.
4. During a one-week period, watch your home television set as much as possible. Use the evaluation score sheet on page 401. Prepare a summary of your monitoring activities and discuss its implications for:
   a. The home viewing habits of children.
   b. The effect of home viewing on patterns of behavior.
   c. The effect of home viewing on school relationships.
   d. The possibility of using selected commercial programs in improving classroom instruction.
5. Arrange to view kinescope recordings of television broadcasts or telefilms. If possible, select some of those listed on page 445. Report your reactions to the class.
6. View such films as *Coaxial* (Bell Telephone Company), *Sightseeing at Home* (General Electric Company), and any others you can locate on the subject. Report on how such films can be used to impart a better understanding not only of the techniques of telecasting but of their implications in terms of general education. On the basis of your knowledge of existing telecasts, select a television program which you believe will enrich classroom learning, and prepare a study plan for its use.
7. Make a simple diagrammatic layout that will permit a typical group of children to watch television in the classroom effectively. Specify the kind of set and indicate the location of equipment, etc., so as to visualize the classroom layout.

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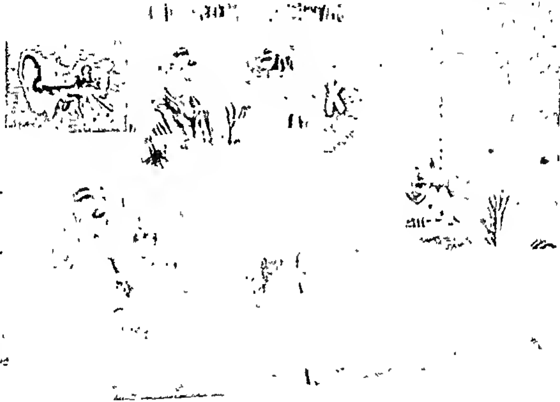
15.



Case Examples of the Use of Audio-Visual Materials

VARIOUS AUDIO-VISUAL MATERIALS HAVE BEEN DISCUSSED INDIVIDUALLY in preceding chapters. The purpose of the present chapter is to demonstrate through case examples how these visual instruction materials, strong in and of themselves, are even more powerful when used together.

A film may be an effective learning experience *per se*. A field trip may bring much new information to the learner who took it. A map can be a means of becoming acquainted with the world. Books have untold values. When film, field trip, maps, and books are carefully coördinated by planned use, the learning that results can be much more than the sum of the individual parts.

Before a teacher attempts to select and plan the use of classroom materials, he must know the goals of instruction.

IDENTIFYING LEARNING GOALS

Learning problems in the classroom are as broad as the curriculum the school offers. They may be defined in terms of the goals to be achieved. The primary teacher's goals may be to develop number readiness, greater language facility, or increased interest in reading and attainment of reading comprehension. The goal of the social studies teacher may be to impart information about other people—their cultural patterns, their home relationships—or, more important, to establish socially desirable attitudes toward other people.

The means by which teaching goals may be achieved are varied and complex. They may include reading, or actually going to live in the cultural group being studied. Between these two extremes lie the audio-visual instruction materials which, because of their interesting and

	16 mm Sound Motion Picture Films	Filmstrips	Slides	Flat Pictures and Tackboard	Posters and Charts	Maps	Chalkboard	Field Trips	Radio	Recordings and Transcriptions	Tape Recorders	Models and Specimens	Television and Kinescopes
VISUAL													
Visually re creates situations involving motion which occur anywhere	X							X				X	X
Visually re-creates the past	X	X	X	X	X		X					X	X
Visualizes theoretical ideas and microscopic life	X	X	X	X	X		X					X	X
Visualizes with natural color	X	X	X	X	X			X				X	X
Visualizes natural dimensions (three dimensional)	X	X	X	X			X	X				X	X
AUDIO													
Re creates characteristic or environmental sounds	X	X*						X	X	X	X		X
Re creates events through dramatization	X	X*							X		X		X
UTILIZATION													
Sequence fixed	X	X											X
Flexible organization permits rearrangement			X	X	X	X	X	X		X	X	X	
Permits restudy	X	X	X	X	X	X	X	X		X	X	X	X
Permits leisurely examination, discussion, etc		X	X	X	X	X	X	X		X	X	X	
Control of time and place of use	X	X	X	X	X	X	X	X		X	X	X	X
Can usually be produced locally	X	X	X	X	X	X	X	X	X	X	X	X	X

*Sound filmstrips only

Fig 15.1. Contributions of audio-visual instructional materials to learning

flexible formats, can bring right into our classrooms tangible, real-life information about remote cultures, peoples, places, and things.

SELECTING SUITABLE TEACHING MATERIALS

After the goals of instruction have been defined, the teacher will need to arrange for learning experiences which will be useful in helping his pupils attain these goals.

Teaching materials—field trips, pictures, transcriptions, charts, books,

films, slides, etc.—have unique characteristics. Hence, the selection of suitable materials should be based on how well they will help the pupils reach their goals. In Fig. 15.1 are summarized the various characteristics of audio-visual teaching materials that were discussed in earlier chapters.

Other factors which must be considered in selecting instructional materials include the following:

1. Accuracy and authenticity of the information.
2. Suitability for the grade level in terms of vocabulary, pace, and general understandability.
3. Mechanical excellence of sound, vocabulary, color, and other general "see and hear" factors.

Audio-visual materials should be selected or rejected in terms of how well they perform their intended function. The answer to this question will be found in the extent to which the purpose of such materials is clearly indicated.

The following case examples demonstrate some of the ways in which well-selected and carefully used instructional materials can help in achieving good classroom learning.

CASE EXAMPLES

SECOND-GRADE SOCIAL STUDIES—ABOUT PETS

The second-grade children and their teacher stopped before one of the cages at the zoo. They watched the squirrel as it scampered around in its play. Observing the children's keen interest, the teacher unsnapped the camera case and photographed the squirrel in the afternoon sunlight.

A week later she put an enlargement of the photograph on the display board. When she did this, the children asked many questions. Would that squirrel make a pet? Are there little squirrels? Who takes care of squirrels? Where do they sleep? Will there be other squirrels? What do squirrels eat? How old are squirrels? How can squirrels climb so well? Do they ever fall? Would they be hurt if they fell?

The camera had registered what it saw, and the children now "saw" again from the picture; but their many questions pointed to the need for more sensory experience.

A return trip to the zoo? More pictures about squirrels? A tame squirrel

to live in the classroom? Books? All these were possibilities. But in this case more pictures were available.

It is story time, a filmstrip[1] is being shown. A picture of squirrels eating appears on the screen (Fig. 15.2).

"What can someone tell us about this picture?" the teacher asks.

"The squirrel is standing on his hind legs to reach some food."

"They look like pussy willows."

"They are," the teacher says. "Can you think of any other words to describe pussy willows?"

"Buds?"

"Yes. Now let's look at the next picture. What is happening?"

Fig. 15.2.

As other pictures are shown, the children discuss action words and the teacher writes interesting words on the chalkboard:

What squirrels eat:
- pussy-willow buds
- acorns
- nuts

What squirrels do:
- run
- jump
- build summer nests
- climb trees
- bury nuts
- drink water

The next day, at story time, the children make up an *experience story*. As they volunteer ideas, the teacher writes them all down on the chalkboard:

Mother Squirrel lives in an oak tree.
Three baby squirrels live in the nest.
The baby squirrels sleep close to mother.

[1] *Gray Squirrel*, 73 frames, Silent, B&W, Encyclopædia Britannica Films.

There is every evidence that the children's experience story has been largely inspired by the filmstrip they saw.

The children then "write" this story on paper. Some of them draw crayon pictures to illustrate their stories.

"How did we find out all these interesting things about squirrels?" the teacher asks.

"We saw a squirrel at the zoo."

"Yesterday we saw pictures about a mother squirrel and her babies."

"They grew up, though."

And the discussion continued. The zoo and the filmstrip were the basis for arousing interest, creating understanding, and at the same time raising questions about things not yet completely understood: How does a squirrel know how to bury a nut? What happens if it never finds the nut it has hidden? How can a squirrel remember where it has hidden the nuts?

Again the teacher guides the children in continuing their experiences of discovery and understanding. The new questions they ask are written on the chalkboard to become additional goals.

"How can we find out how baby squirrels learn to climb?" asks the teacher.

"How do they climb?" "Why don't they fall off the tree?" "Does the mother teach them?" These and other questions come from the children.

The teacher continues: "We didn't see any baby squirrels at the zoo. We didn't find out by watching the filmstrip. But if we could live right with the squirrel family from the time the babies are born . . ."

The children with their vivid imaginations voice their wishes and hopes for the make-believe idea. But one more mature child ventures that it can't be done. Thereupon the teacher explains how a motion picture was made of the squirrel family, how the camera could see inside the oak tree, how cameramen came back day after day to take moving pictures of the growing squirrels, and how today, as a result, the children can see right inside the squirrel nest and watch the babies day by day as they grow, learn to climb and hunt for food and bury acorns, and later "sniff" their way back to the buried nuts.

 The children take their places to see the 16 mm. sound motion-picture

film *Gray Squirrel.*[2] The film is followed by discussion of the new things the children saw.

"Baby squirrels can't leave their nest."

"Mother Squirrel has to teach the babies how to hold onto the bark."

"The nest was inside a tree."

Discussion of factual ideas was soon interrupted by an occasional critical judgment.

"I liked the film best. I could see things move," one child said.

"Sometimes it went too fast," another commented. "I like the pictures that stayed there longer."

"When can we go to the zoo again?" a third child asked.

Adults may argue the various merits of different visual instruction materials. But listening to these children's reactions to their experiences with squirrels indicates clearly that many approaches to the same learning problem must be provided if all the children are to benefit, each in terms of his individual capacity and interests.

Days later, after many experiences with squirrels, reading materials are used.

"I have a wonderful picture storybook for you today," the teacher says.

A gray squirrel book[3] is given to each child. Eagerly they open the books. Almost immediately they recognize pictures, then words that they used during story times which were put on the chalkboard, and those used in the experience stories. The teacher listens:

"Here are the pussy willows."

"The squirrel is eating the 'pussies.'"

"Who remembers what else we called pussy willows?" the teacher asks.

"Buds." This from several children.

"Who can find that word on this pussy-willow page?" (Fig. 15.3.)

The children point and make comments.

The teacher asks a child to read page 1, then asks, "What are 'tender buds'?"

"Buds that squirrels like."

[2] *Gray Squirrel*, Sound, B&W, 10 min., Encyclopaedia Britannica Films

[3] Paul Witty, *Gray Squirrel* (It's Fun to Find Out Series), Heath, Boston, 1953.

MOTHER GRAY SQUIRREL
AND HER BABIES

It is spring in the woods.

Mother Gray Squirrel is eating her breakfast. She eats the tender buds. She holds the buds in her front paws.

Fig 15.3

"Soft, juicy, good buds," a girl volunteers.

The reading continues. Always there is evidence that past experiences offer "cues" to word meanings. Again and again it is apparent that ideas must precede word comprehension.

The children read well. Occasionally a noun is called by a synonym or a verb is replaced by a closely related action word of similar meaning. But the children help one another. They learn together just as they have experienced together.

Because they have experienced widely, they will continue to talk freely, with interest and effectiveness, they will read with increasing understanding and fluency, and they will be able to create interesting stories, drawings, poems, songs, and dramatic episodes.

As young learners, these children will develop effective and simple study and work habits. As they go on through the grades they must have the continuing advantage of a rich mosaic of learning experiences which will make learning interesting, achievement possible, and play purposeful.

INTERMEDIATE-GRADE LANGUAGE ARTS—ABOUT LONGFELLOW

As was said in Chapter 2, the basis of all understanding is to be found in perceptual experiences, the things we perceive, see, examine, or inquire into. Only on a broad basis of first-hand experiencing are we able to attain the higher-level mental activity known as reflective thinking, out of which there may emerge a new or reaffirmed attitude toward some thing, event, or person.

It is our purpose here to discover how various audio-visual materials of instruction may contribute in teaching a unit of work in American literature. The goals in this teaching situation were as follows:

1. To develop an appreciation of the poems of Henry Wadsworth Longfellow.
2. To discover as much as possible about Longfellow as both child and man.
3. To find out about how Longfellow lived—his surroundings, his home life, and his professional responsibilities.
4. To discover why Longfellow chose the subjects he wrote about.
5. To discover whether studying about Longfellow and his poetry

inspires the children to creative thinking or expression of their own.

Twenty-six sixth-grade children undertook this assignment. They varied in age from ten years six months to thirteen years one month. Discussion revealed that they had less-than-average interest in poetry as such.

The classroom had adequate chalkboard and display space. Half of the bulletin board contained pictures about Longfellow and his home and neighborhood. There was a political map of the United States. The classroom bookshelf held an encyclopedia and dictionaries, and volumes of Longfellow's poetry on loan from the main library. A record player was set up in readiness to play back recordings of his poetry, and there were projectors for showing filmstrips and films about him.

The following is an actual transcript of conversation between teacher and pupils:

TEACHER. Do you have some favorite poems? (*Pause.*) Poems that you like to read?

GARY. I don't read many poems.

TIMOTHY. I can remember some poems, but I can't think of their names.

BILL. I know that there's one about going fishing, but I can't think of the name either.

MARY. One about daffodils.

TEACHER. I think I know. It's called "To a Daffodil." How many of you have read that? (*Several hands are shown; not much enthusiasm is evident.*)

GRETCHEN. I think that was Longfellow.

TEACHER. That's right. "The Children's Hour" is also one of my favorites. Who has another favorite poem? (*No response, general apathy.*) Would you like to hear the poem Gretchen likes best? (*Teacher walks over to the bookshelf, picks up one of the collections of Longfellow's poems, finds place and reads*)

"Between the dark and the daylight
When the night is beginning to lower,
Comes the pause in the day's occupations,
That is known as the Children's Hour.

"I hear in the chamber above me
The patter of little feet,

The sound of a door that is opened,
And voices soft and sweet." (*Teacher stops reading.*)

Can any of you guess anything at all about the man who wrote that poem? Can you imagine what kind of a person he was?

JIMMY. It was by Longfellow.

TEACHER. Yes. Does the poem tell you even one thing about him?

EVELYN. He liked children.

GRETCHEN. Well, the poem is about children; he must have liked children.

TEACHER. Was this one of the ways then that Longfellow took to tell us that he liked children? (*Pupils nod assent.*) He let us know how he felt by writing a poem, didn't he? When you feel some way about something, when you have an idea, how do you tell other people about it?

LARRY. Well, I don't write a poem about it.

ELLEN. I just talk natural.

TEACHER. How else can we tell people what we think about things?

JEAN. I sometimes like to draw pictures about things I like.

HILDEGARD. I could write a letter about it.

HELEN. I sometimes write about interesting things in letters, but I do it just as if I was talking. I write to my cousin that way sometimes.

TEACHER. That's right. We can talk about our ideas, we can write them just as we talk or might even want to draw pictures about them. I can think of other ways, too.

LEE ANN. I tell how people feel by the way they act.

TEACHER. Yes, we often show how we feel. How could we tell each other about a poem by using just actions?

LEE ANN. Why, I guess we could act it out.

GRETCHEN. I'd like to do that.

TEACHER. And I believe we could. Now let's get back to talking about Mr. Longfellow. Here's another poem I think will interest you. You boys will like this one, "Paul Revere's Ride."

JIMMY. Oh, I've heard about that one.

PAUL. I've read that one too.

MARY. Oh, that's a good one.

TEACHER (*reads*)

"Listen my children, and you shall hear
Of the midnight ride of Paul Revere,
On the eighteenth of April, in Seventy-five;
Hardly a man is now alive
Who remembers that famous day and year.
He said to his friend, 'If the British march
By land or sea from the town to-night,
Hang a lantern aloft in the belfry arch

Of the North Church tower as a signal
light,—
One, if by land, and two, if by sea'";

(*Teacher stops reading and asks*) Does that give you any more ideas about this man, Longfellow?

SAM. Well, he was interested in Paul Revere.

MARY. He was interested in the war. He wanted to tell us about it.

TEACHER. What war was that?

MARK. The war of '75.

TEACHER. What century '75?

MARK. 1875?

TOM. 1775.

MARY. Well, it couldn't have beeo 1975.

TEACHER. We've got it *down* to within one century, haven't we?

MARK. What year was it?

TEACHER. I'm not going to tell you. I'm going to ask you to find out.

MARK. Oh, I'll find out all right.

TEACHER. How?

MARK. May I go over to the encyclopedia and look up "Paul Revere"?

TEACHER. Sure, go to it.[4] Would you like to hear the rest of the poem, "Paul Revere"? (*The hands of most of the children appear.*) How many of you would like to read the poem? (*Most of the hands appear.*) I'll just return this book to our bookshelf, and if you wish to, you may find it there. (*Replaces book on shelf, first inserting an obvious place mark which children note. Teacher picks up another volume.*) Here is another interesting poem which Longfellow wrote. It's called "Hiawatha." What do you suppose it is about? (*Many hands appear.*)

ETHEL. Must be about Indians. (*The children nod assent.*)

TEACHER (*begins to read*)

"*By the shores of Gitche Gumee,*
By the shining Big-Sea-Water,
Stood the wigwam of Nokomis,
Daughter of the Moon, Nokomis.
Dark behind it rose the forest,
Rose the black and gloomy pine-trees,
Rose the firs with cones upon them"; (*Teacher stops reading*)

LEE ANN. Let's hear some more.

TEACHER. No, first let's describe this place.

[4] Notice how the children are completely at a loss in identifying events of the past, even though in their social studies they have been studying stories of the Revolution. The concept of time past is very difficult, and it is only by associating events with people that we can attach reasonableness to the concepts which past times and dates imply.

GUNTHER. Well, it's on a shore.

BILL. And there're pine trees there.

TOM. And fir trees, too.

LEE ANN. And it's gloomy, don't forget. Sounds like something's going to happen.

TEACHER. How many of you have been to a place something like that? (*Most hands are raised.*) Would you like to hear me read some more, then? (*Most hands are raised and heads nod.*) Well, I'm not going to. I'm going to put this book right back here with the rest and if you'd like to read it, you may.

Let's talk some more about this man. Aren't you getting a little curious about him? (*The pupils nod assent.*) What are you beginning to get curious about?

LEE ANN. I'd like to know about some more of the poems he wrote.

GRETCHEN. I'd like to know what kind of a little boy he was when he went to school.

LARRY. I'd like to find out about that, too.

JERRY. What made him start writing poems?

DANNY. I know how he started writing poems. When he was little he went to school and the teacher told him to write a poem. Longfellow didn't know what to write about so he went outside and looked around and he saw some things and started writing about them.

TEACHER. That *might* have been the way it happened, Danny. I wonder how we can find out whether that really happened that way or not.

DANNY. Well, we could read up about Longfellow. Maybe that will tell us.

TEACHER. Let's get some of our ideas down in writing. (*Turns to chalkboard and starts writing.*) (1) Larry wants to know why Longfellow wrote poems. (2) Gretchen wants to know about Longfellow's childhood. (3) Jerry said, "What are some other good poems that we can read?" (*Discussion continues; teacher writes down additional points.*)[5] Look at this list of things you are interested in finding out about. (*Pause.*) What can we do to find out the answers? Where can we look for information? (*Long pause.*)

DRUCILA. We can "look up" about him.

TEACHER. How can you go about that?

DRUCILA. In the encyclopedia?

LEE ANN. I think our librarian would help me find some books about it.

TEACHER. Where else can we go to look up information?

JEAN. To the dictionary.

LARRY. You wouldn't find much there. It doesn't say much.

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[5] At this point interest seems to be stimulated in the children. They have become motivated, fascinated with the possibilities of knowing more about Longfellow. While no teacher can motivate a child, it is the teacher's responsibility to put opportunities and experiences in the child's path so that on encountering them he will become interested and be motivated to investigate and thereby increase his information.

MORGAN. Aren't there some books in the library that tell about the life of Longfellow? (*Classmates express agreement.*)

TEACHER. What we've all thought about so far means that we can find out more information about Longfellow through reading, through words. But tell me, how are we going to know what all these words mean? What other way do we have to find out about Longfellow other than going to books?

LEE ANN. We can read more of his poems.

TEACHER. But that's more about words, isn't it? If you could do anything you wanted to do to find out about Longfellow—now remember what I said—anything at all, what would you like to do to find out more about this man? (*Long pause.*) You may even imagine that you are magical. Think of any way you wish to find out more about this man.

TOM. Well, if we were magic we could have Longfellow come to life again. We could ask him to come right here and talk to us.

TEACHER. What else might we do?

BETTY. Anything at all?

TEACHER. Yes.

BETTY. Why, I'd like to make-believe I could go and visit him right in his home.

BILL. Sure, if we could go and visit him, we could ask him all our questions. Maybe he could even read to us.[6]

TEACHER. Yes, if I could do anything I wanted to, I'd either ask Longfellow to come here or I'd see if we couldn't go visit with him.

LARRY. Aw, but he lived a long time ago. We can't do that.

TEACHER. No, Larry's right, there isn't much we can do about that today. Or I wonder if there is? (*Long pause.*) What's the nearest thing we can do today right in our classroom, the nearest thing to going to see Longfellow or the nearest thing to bringing him right here in our classroom? Who's got an idea? (*Long pause.*)

JEAN. Oh, you mean the television play?

TEACHER. No, we couldn't do that here. We don't have a set yet.

MORGAN. Maybe a radio program.

TEACHER. Yes, and it's my job to know if there have been any radio programs, isn't it?

TOM. You're thinking of a movie, I bet.

TEACHER. That's it. When I knew we were going to begin studying about Longfellow, I went to our librarian and she helped me pick out all those books. See them over there on that shelf? (*Pupils look over toward shelf and nod.*) I also discovered, when I had a talk with our audio-visual supervisor, that there are some films which have been made on the subject of Long-

[6] The children have expressed their natural eagerness to observe at first-hand, to engage in realistic methods of inquiring. They have revealed their own desire for learning through first-hand experiences.

Fig. 15.4 The film Henry Wadsworth Longfellow re-creates an incident of long ago which would otherwise be denied today's learners.

fellow. Well, I've previewed them and I've selected one which is called *Henry Wadsworth Longfellow.* I wonder if some of the answers to our questions aren't in that film? (*Pupils nod eagerly.*) So now, boys and girls, we're going to do just what you said you'd like to if you could. We're going back

to "visit" Longfellow (by seeing the film). That was Tom's suggestion, wasn't it? (*Children nod.*)

There's one thing we should do first. Yesterday afternoon I thought I had better look at this film to see what it was about, and as I looked at it, I discovered that it was very interesting. But there were a few words in the film that I'm not sure that I knew. (*Teacher turns to chalkboard and writes.*) "Brawny arms," "chestnut," "village smitby," "reading at law," "Portland, Maine."

How many of you know all of these words? (*One hand appears.*) All right, Gary, tell us what the first one means . . .

GARY (*pronouncing it slowly*). "Brawny." I know how to prooouoce it.

TEACHER. But does that mean that you know its meaning?

GARY. I guess not.

TEACHER. Well, what do you think we ought to do about that?

GARY. Well, look them up, I guess.

TEACHER. Well, Gary, do you think you really should look them up?

GARY. I don't know.

TEACHER. Will it make any difference if we know the meanings of these words? Will it make any difference whether or not we can understand this film? (*Pause; pupils obviously don't see any reason for knowing the words.*)

Let me ask you a question. When we do some regular reading in our geography book or our nature study book, what do you do sometimes when you run across a word you don't know the meaning of?

LARRY. I skip them. (*Class laughs.*)

TEACHER. Well, what's going to happen to your reading, Larry, if you keep on skipping the words you don't know?

LARRY. I guess it won't be so good.

TEACHER. Well, what do you think we should do?

LEE ANN. Well, we ought to look them up so we know what we're reading about.

TEACHER. And where will we look them up?

LEE ANN. In the dictionary.

TEACHER. All right, let's look up some of these words. Let's look up "brawny." Let's look up "chestnut." Let's find out about Portland. (*Children look up words and word study continues. Next they review their own questions about Longfellow and then see the 16 mm. film,* Longfellow,[7] *in their classroom. After it ends, the discussion continues.*)

TEACHER. Have you found the answer to any of our questions? (*Teacher refers to the chalkboard list of things to which the children were interested in finding answers.*)

JACK. I heard a new poem that I didn't know he had written.

[7] Sound, B&W, 16 min., Encyclopædia Britannica Films.

TEACHER. What was it called?

LEE ANN. I think it was "The Arrow and the Song."

JACK. That's right. That's a nice one. I can understand that.

TEACHER. What was it about?

JACK. It was about friendship and being decent to people.

TEACHER. Does that help us to understand Longfellow?

MARY. Yes, it tells us that he was a friendly man. He liked people.

TEACHER. You'll find that poem in our collection of books over here on our room bookshelf.

Did the film tell us very much else about his childhood?

GARY. Not much.

TEACHER. Have we a right to expect that all the answers to our questions would be found in this one film?

GARY. No, I guess not. Guess we'll have to find it somewhere else.

TEACHER (*holding up filmstrip*). I wonder if there is some information about Longfellow's childhood in this filmstrip.[a] Who would like to take this over to the projector (that is, during our next study period) and look through it and see whether he can find additional information? (*Many hands are raised.*) All right, Gary, would you operate the machine? (*Gary nods assent.*) Who would like to work with Gary? (*Hands appear; a committee of five children is named to work with Gary.*)

One of the things we wanted to do was find more poems by Longfellow. Let's make a list of the poems we now know.

MARY. "The Arrow and the Song."

GARY. "Paul Revere."

JEAN. "The Children's Hour." (*Continued discussion, and teacher lists titles on chalkboard.*)

TEACHER. We have talked about nine poems. We've heard several of them mentioned in the film, have we not? But certainly he wrote more! Who was it who was interested in finding out more about the poems which Longfellow wrote? (*Hands appear.*)

GERTRUDE. I was.

TEACHER. Where can we find more of them?

GERTRUDE. I guess in that shelf of books over there.

LEE ANN. I'm sure I saw a book about Longfellow's poems at home.

TEACHER. What idea does that give you?

LEE ANN. I could bring the book.

JERRY. If Lee Ann finds some interesting poems, she might bring them in and read them to us.

TEACHER. How about that, Lee Ann?

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[a] *Longfellow*, 25 frames, Color, Curriculum Films, Inc. Presents significant influences in the author's life and shows the America in which he lived and for which he wrote.

Lee Ann. I'd like to.

Teacher. Who would like to work with Lee Ann on such a project? (*Hands appear; a committee of two boys and two girls is named.*) Would you like to hear a really "expert" reader of poetry read some of Longfellow's poems? (*Children nod assent; teacher picks up package of records.*) Here are some recordings of Longfellow's poems. Would you like to hear them? (*Children agree that they would.*) I'm going to turn these over to Lee Ann and her committee. During our study period her committee can listen to these and pick out the ones they think are the best and then present them to us tomorrow or the next day. Would you like that? (*Enthusiastic response.*)

At the beginning of the hour one of you suggested that when you want to tell someone else about something you're interested in, you'd like to draw pictures. Who was that? (*Two hands appear.*) All right, Jean. Look around; do you see the tackboard over there? I've put up several pictures about Longfellow, but I've not used even half of the tackboard. Do any of you have any ideas about what we might do with the rest of that board?

Jean. Oh, yes, I think we can find more pictures.

Teacher. It's a hard job to find pictures already made. I had quite a job finding these five. You can try if you like. What else might you do?

Larry. I think we could draw some.

Jean. After Lee Ann finds some poems I think I could draw some pictures that will illustrate them.

Teacher. Is there anyone else who would like to work with Jean? (*Several hands appear; a committee of five children is named.*) The next time we go to the art room and the teacher allows us to decide on our own project, do you think you'll have an idea? (*Nods of assent.*) If we have some ideas about Longfellow or ideas about other things now that we're studying Longfellow, what else can we do?

Morgan. Write a poem?

Teacher. Write a poem? I wonder if we know how? Would some of you like to try? (*Several hands appear.*) Larry, would you like to write a poem?

Larry. No.

Teacher. Well, Larry, you haven't suggested anything that you would like to do so far. Would you like to work with any of these other committees that have been established?

Larry. No.

Teacher. Well, Larry, I'd like *you* to decide what you'd like to do, but sooner or later we'll have to come to a decision, and I'd like the idea to come from you. Either you come up with an idea or I will.

Larry. (*Expresses understanding.*)

Timothy. I've got an idea. I think we could act out that part where Longfellow decides to take a try at writing this poem this other fellow suggested he write.

TEACHER. Who remembers the name of that? (*Several voices.*) Who would like to try being Longfellow, or being Hawthorne? (*Several hands are raised.*) That's fine. Larry, how would you?

LARRY (*shuffles uncomfortably*). I'd rather not. I'll think of something.

TEACHER. Here's something here which I believe will help those who would like to try writing a poem. (*Teacher holds up collection of poems written by fifth- and sixth-grade children; several are read and the book is turned over to the committee. Larry raises his hand.*)

TEACHER. Larry?

LARRY. I think I could draw a picture about that Hiawatha poem.

TEACHER. Good! We'll give you permission to join the bulletin board committee. How would you like that?

LARRY. Sounds O.K. Can I show you the parts I mean?

TEACHER. In just a moment, Larry, I'm glad you volunteered. (*Teacher looks up at the clock.*) Since we have only a few minutes left in this period, let's see what we've decided to do now. Now each of us has his job to do. When we come back from recess, we'll break up into our committee groups. I'll go from one group to the other to see how you're coming along. Does everybody know what we're goiog to do when we come back in now? Fine. (*Class dismissed.*)

Implications

The outside reading habits of this group of children were examined, and it was found that most of the children read what the librarian called more than the average number of books. Why weren't the children enthusiastic or at least mildly interested in Longfellow and his poems at the beginning of the new unit of work?

Someone has said that it is difficult to be interested in things we do not know about. This certainly applies to the appreciation of poetry. These children had little or no reason for being interested in poetry. They had read very few poems and had heard very few poems read. They knew little or nothing about the man who wrote them. Gradually, however, as references were made to the tackboard, filmstrip, transcription, and the sound motion-picture film, growing interest began to be apparent in the reactions of some of them. The children began to see reasons for being interested. They began to feel some degree of motivation. Furthermore, the room was so arranged that it presented many opportunities for getting information and ideas about Longfellow and his poems. Consequently most of the children became increasingly interested in learning more about not only the man but his poetry.

Language activities chosen by the children included creative dramatics, poetry writing, search for additional poems, and preparation of readings for class enjoyment. To this might well be added choral reading, for some of Longfellow's poems offer an ideal opportunity for chorus parts to be read by a group of students, the solo or refrain lines being read by individuals. This type of work is valuable because it permits the children to participate in a very satisfying activity—speaking in unison and ultimately assuming individual responsibility for solo lines.

Use of the map became necessary as soon as the children discovered that there was more than one Portland in the United States. From the follow-up discussion the children learned that it was Portland, Maine, which was referred to in the film. They then associated this Portland with its location on the map and with the man who lived there. This gave some of the children a feeling of closer kinship with Longfellow and his writings. Projection materials of the unit included the motion-picture film and the filmstrip, both on the poet. The film permitted rather complete identification with him—his manner of speaking, his movements, his thinking as expressed through his speech, and his attitudes toward his associates and toward children—and thus made indelible impressions in the minds of the viewers. The motion-picture presentation allowed the children really to live selected experiences with the poet and enabled them to feel that they had actually known him.

The filmstrip, which was used by a smaller group of interested pupils, helped them to review key situations shown in the film. They could discuss at leisure and examine individual frames of the filmstrip as long as they felt a need to do so.

The recordings and transcriptions brought to the children accomplished readers interpreting selected poems by Longfellow. The children heard other interpretations, for the teacher read some poems and the children themselves read the same ones or others. The transcriptions served as still other models to reveal the many inflections and interpretations which can be given a poem.

A JUNIOR-HIGH CITIZENSHIP CLUB—ABOUT THE OTHER FELLOW

In this modern world there is every reason for schools to become increasingly concerned with their responsibility for teaching subject matter. Whether in science, social studies, or language arts, there is more

and more to learn. Frontiers have all but disappeared, and there is more geography to learn. Communication has become instantaneous, and rapid transportation makes everyone a potential citizen of the world.

The circumstances have joined in placing a heavy responsibility on the schools. Today more courses are offered, compulsory school attendance is being extended, more and thicker textbooks are used, and new audio-visual materials are created almost daily. We are surrounded by evidence of the schools' great concern to help students know something and to use what they know.

But what about the ability to use all this information in a socially desirable way? A person may be well tutored and at the same time be lacking in social understandings which enable him to help himself, his family, his friends, and his community live in happiness and peace.

All school staffs must be concerned with their responsibility for helping to guide children toward socially acceptable behavior in the classroom, on the playgrounds, and in the community. The following case example concerns materials and techniques which can help children to attain better understanding of their peers and hence pleasant, wholesome, and helpful social relationships with them.

Among the bigger boys in the seventh grade there was one in particular who was far beyond the others in physical development. He was a good student as well. Unfortunately, he often took advantage of his size in a way that made some of his classmates very unhappy.

"I don't know how Frank can be so inconsiderate," said a teacher. "Why, on the playground he feels he must be first, have the longest time at bat, stay on the giant ladder longer than anyone else . . ."

The principal listened.

"Several of the children asked if they could stay inside during recess today. Then I realized that I had to do something. I've tried making Frank stay in."

The principal picked up the conversation.

"Some children just naturally fall into teasing, bullying habits. And unless we do something about it, the habit may become fixed for life. We have to help the children learn how to deal with teasers, and Frank should have a chance to see himself. I've spoken to Frank about his behavior, and I suggest the whole class do some role playing."

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The next morning the seventh-graders were discussing stories they had written on "How to Have Fun on Our Playground."

Jean reads: "The giant ladder is lots of fun. There is room for six or seven children on it. Sometimes one boy will get on it and keep everyone else off . . ."

Betsy reads: "The softball games are wonderful. Sometimes we have to stop because somebody won't give up his turn at bat, and we can't make him because he's too big."

The other children read their stories. They tell about interesting games and the fun they have on the equipment; most of them refer to Frank's teasing ways. Frank grins and enjoys it.

The teacher interrupts. "These are fine stories. Some of the ideas are so good that I suggest we act out one or two of them."

The children discuss the stories and decide on the softball incident.

TEACHER. Who will be the catcher? (*Children volunteer.*) The pitcher? The batter? (*Others volunteer.*) Come up here (*indicating space at front of classroom*). Each of you talk and act just as if you were on the playground. Forget you are here in class. Say and do just what you think the batter, catcher, and pitcher would. (*The children talk over ideas and take their places.*)

CATCHER (*pantomimes cue to pitcher*). Right here, Chuck?

PITCHER (*pantomimes pitch and the batter swings. The role playing continues.*)

CATCHER. That's three strikes and you're out!

BATTER. Aw, just one more.

CATCHER. That was *three;* you're out!

BATTER. *I want one more.* (*Batter stands firm.*)

The children in their seats talk first among themselves, then support the growing argument carried on by the role players. Frank grins but says nothing.

The teacher intercedes and thanks the children, who return to their seats. Other playground incidents are treated in this way—fair play in choosing teams, taking regular turns at the swings, and settling a dispute about base running.

At noontime the teacher talks to Frank about his behavior, complimenting him on the good grades he receives and on his fine bodily coordination and growth. She suggests that he is using his strength and

intelligence in unsportsmanlike ways, and she attempts to show him why he is not liked by his classmates.

The teacher can help guide and control the situation at school, but reports soon come in from some of Betsy's friends that Frank is plaguing her with nasty remarks and never-ending taunts about tattling. Apparently Frank considers that the story Betsy wrote is the reason for the embarrassing role playing and the teacher's remarks about sportsmanship.

The teacher, realizing that Frank's behavior off the school grounds is less easy to guide, has another helpful conference with the principal. They agree that there *are* teasers and probably always will be, that teasers in school may become disturbing elements as adults, and that the school has a responsibility to guide children in situations involving teasing.

A search for methods and materials reveals a 16 mm. film about teasing which might be helpful. The film, *The Other Fellow's Feelings*,[8] is scheduled to be shown several days later. It portrays a classroom situation in which a boy teases a girl beyond endurance. It poses the question of how such a situation should be handled and suggests several possible ways but leaves the actual decision to group discussion following the film.

TEACHER. We're going to continue our stories about citizenship at school and at home. Instead of listening to stories which we have written or reading stories in our books, we will see a film today about pleasant and happy living in school. As you watch it, will you think about things such as these:

a. Do you ever act like the boys and girls you see and hear?
b. If you were Judy, what would you do?
c. If you were one of Judy's friends, what would you like to do?

As the children see the closing scenes of the film, additional questions are asked by the narrator:

Should Judy have gone to her teacher to ask for help?
Should Judy try to retaliate?
Should Judy just ignore the situation?
Should Judy go to her parents for help?

The teacher's questions and those asked by the film narrator give the seventh-graders many ideas:

[8] Sound, B&W, 10 min., Young America Films.

PUPIL. I'd just tell Jack what I thought about teasing. I think he'd stop if he knew I didn't like it.

PUPIL. If I were Judy, I'd get a bottle of perfume and break it over his head. Why he's so mean . . .

PUPIL. I'd go tell my big sister. She would tell Jack a thing or two.

The discussion continues. Finally the teacher asks if anyone would like to act out one of the ideas expressed. Several children volunteer.

TEACHER. Alice, will you be Judy? Bill, you try being Jack. (*Bill and Alice talk quietly about their plans.*)

ALICE (*to teacher*). We both need friends. (*Friends are chosen and the action begins. Alice and her friend walk slowly across room. Bill and his friend follow.*)

JACK. Judy uses the smelliest perfume. (*Judy evidences discomfort but continues walking. Jack begins calling Judy names.*)

JACK. Judy's a smelly; Judy's a stinky. (*Judy ignores it.*)

JUDY'S FRIEND. Jack is just terrible. I think you should tell your mother.

JUDY. I'm just going to ignore Jack. (*Jack continues following and calling names.*)

JUDY'S FRIEND. Jack has been doing this for days, Judy.

JUDY. I'm not going to be a tattletale. I'm just going to ignore Jack. (*They continue walking. Jack picks up imaginary pebble and throws it at Judy. He continues teasing.*)

JUDY'S FRIEND. Judy, Jack will never stop. Let's go and tell your mother.

JUDY. No, I won't do that.

JUDY'S FRIEND. Then let's ask our teacher to help.

JUDY. No.

JUDY'S FRIEND. If you don't, Jack will keep right on teasing you.

The girls end the action by ignoring Jack and return to their seats.

"Do you think Judy is right in ignoring Jack?" the teacher asks.

The children discuss the "play" situation. Some agree that she is right; others suggest that there is a limit to teasing and that good sportsmanship is a two-way responsibility. Most agree that they want to settle their own problems if they can.

"Does anyone else have a different idea about Judy and Jack?" This question from the teacher brings forth other possible solutions which are role played:

1. Judy retaliates by calling Jack as many names as Jack called her.
2. Judy's friends accuse Jack of poor sportsmanship.

3. Judy's friends retaliate by messing up Jack's desk in his absence and leaving an explanatory note.
4. Judy asks the teacher for help.
5. The Citizenship Club elects two boys and two girls to a committee on sportsmanship.

In acting out this idea, Jack stands before the committee:

CHAIRMAN. Jack, you've been teasing Judy about that perfume.
JACK. Aw, I was just having fun.
COMMITTEE GIRL. It isn't fun when you do it all week.
JACK. Well, Judy shouldn't bring smelly perfume to school.
CHAIRMAN. We all know you're jealous of Judy because she won that essay contest, and you didn't. (*Jack says nothing.*) We've decided that if you're going to be a poor sport and keep on calling Judy names, we won't let you play ball with us during recess.

When these children return to their seats, the class discusses forming a sportsmanship committee in their own room. Frank sits quietly. He no longer grins.

Implications

As the sound film says at the end, "There will always be teasers"—in school, in the neighborhood, in adult organizations, and in business. When an individual uses his strength to harm others, he may be called a bully. Bullies may constitute unsocial, subversive groups; and subversive groups may foment grave social conflict, even war.

If the people who teach in our schools will more completely accept responsibility for guiding youth toward right social thinking and action, possibly we can achieve the seemingly unattainable peaceful adult relationships we all know can and should exist.

Human relationships cannot be taught from a textbook. They must be lived. Acceptable social relationships must be experienced. Certainly no subject discussion is so important that it should not be interrupted when circumstances arise in which a teacher-pupil group can discuss and think through the right and wrong of a social situation that affects the well-being of the group.

Group discussion is useful in examining the unsportsmanlike or cruel actions of an individual pupil. Dramatic play is a fascinating and realistic way of reconstructing circumstances. Role playing allows a situation

to be objectively examined because not only can the situation itself be enacted but the feelings and reactions of many persons can be revealed when one situation is enacted many times, each time with a new "cast." Through role playing a child can reveal himself, both to himself and to others.

Good teaching materials on social behavior are available. In addition to stories about sportsmanship, citizenship, and group living, many fine 16 mm. sound motion-picture films are available, such as the following (Fig. 15.5): *Act Your Age* (Sound, B&W, 13 min., Coronet Instructional Films), *Developing Friendships* (Sound, B&W, 11 min., Coronet Instructional Films), *Developing Responsibility* (Sound, B&W, 10 min., Coronet Instructional Films), *Glen Wakes Up* (Sound, B&W, 10 min., Young America Films), *Social Courtesy* (Sound, B&W, 10 min., Coronet Instructional Films), *The Other Fellow's Feelings* (Sound, B&W, 10 min., Young America Films), and *You and Your Friends* (Sound, B&W, 8 min., Look Magazine). Films such as these can inspire worth-while discussion and dramatic play.

If schools today are truly attuned to their social responsibilities, they will make provision for discussing the possibility of attaining higher levels of socially valuable living.

A TEEN-AGE UNIT—ABOUT TRAFFIC SAFETY

The Problems of Democracy class had an approximately equal number of boys and girls. Since the course was an elective, both juniors and seniors were enrolled. Many had completed courses in American history and civics, and were now approaching the unit on traffic safety, having previously done work in housing, labor-management relationships, and price control.

The social studies teacher wrote the unit title on the chalkboard—Operation Safety—then turned to the class, paused a moment to be sure of the group's attention, and began with slow emphasis:

TEACHER. What can be done to end needless loss of life?

In the less than 24-hour attack on Pearl Harbor, 3800 Americans were killed. In the Korean conflict, 32,000 of our men were destroyed.

But during *each year* of World War II about 38,000 Americans were killed, and nearly one million injured, not in war but in *traffic accidents*.

More of our people have been killed by automobiles than have been de-

Fig. 15.5. Top: From *Developing Friendships* Bottom, left: From *The Other Fellow's Feelings*; right: from *Developing Responsibility*.

stroyed in all the wars in which we have fought. It is not war, not the atom or the H-bomb, but the automobile that is the dread killer of today! The automobile is usually considered a very necessary part of life by youth today; to live withnut a car would be unthinkable. It is a phenomenon of the twentieth century, hnwever, and should be explained as such. The automnbile should be understood as a mechanical marvel, as a means of individually controlled transportation, but also as *a potential means of destruction both* nf the individual and of others.

The following are suggested as objectives of a study of traffic safety:

1. To understand the fact of the automobile, its history and place in American life.
2. To understand the amount of human destruction due to traffic accidents.
3. To awaken a sense of moral responsibility in the high-school pupil as the driver of a car, or a passenger or pedestrian.

I'd like to read to you several newspaper clippings I have gathered during the last two weeks.

AREA YOUTH KILLED IN TRAFFIC COLLISION

Friday. Three persons were hurt and one killed at the intersection of Highways 51 and 31 Thursday night during a drizzling rain that made highways extremely slippery. Raymond ———, age 17, was killed immediately when two speeding cars collided at the intersection. Witnesses reported both cars approached the intersection at excessive rates of speed.

THIRTEEN KILLED IN STATE: 21 INJURED

Sunday. The state holiday toll, still incomplete, brings to 13 the number of holiday week-end highway traffic fatalities. With 12 hours yet to be reported for the three-day holiday week end, state traffic deaths and injuries promise to reach an all-time record. The worst county accident reported involved a teen-age driver and passengers. Alfred ———, age 19, and Carolyn ———, age 17, were killed Saturday afternoon when their car went out of control, left the road and crashed head-on into a power tower 20 yards from the highway. Seriously injured in the same accident were . . .

NATION'S HIGHWAY TOLL EXCEEDS ESTIMATE. MAY HIT 520 IN 72-HOUR WEEK END

Monday. The long holiday week end drew to a close at midnight Sunday with the prospect that last week's estimated 520 traffic deaths would be exceeded. In a pre-holiday forecast, over 420 persons were expected

to die as a result of traffic mishaps—220 in traffic collisions, 120 in accidents caused by speeding or loss of control of the car. . . .

FOUR KILLED IN AUTO MISHAPS, COUNTY TOLL CLIMBS TO 17

Saturday. ______ County's auto death toll stood at 17 Monday—four above last year's figure—following five accidents in which four persons were killed and 11 injured.

Well, what have you to say? (*There is a full minute of silence; the teacher waits quietly.*)

HUGH. It's plenty bad! (*More silence.*)

ANN. Everyone of us ought to have to pass a driver-training course before we graduate from high school.

JOHN. It's the guys who drink who are causing all these accidents. After they get to be 21 and can buy liquor, they begin having accidents.

BEN. Sure, it's the adults—they cause the accidents—and then we get yelled at. The teen-agers get blamed. We're always getting blamed. (*Nods of agreement from many.*)

SUE. Ben, you have to admit that the hot-rod gang in this very school has had more than one accident this last semester—and some who aren't "hot rods"—

BEN. O.K., O.K. (*in resignation*). (*Silence.*)

TEACHER. Ann would like to pass a law—make everyone take driving training —John thinks it's autos and drinking, Ben and Ann are willing to argue about adults causing more accidents—Where shall we begin? What do you think we need more of?

CAROL. I think we need more information. Susan and Ben won't get anywhere with an argument. Let's find out.

TEACHER. You're suggesting a little background research. Who'll take a try? Where do we begin?

CAROL. There certainly should be accident information in the library.

TEACHER. There is. The National Safety Council publishes a yearbook called *Accident Facts*. Who'll locate it? It should be in our library.

MARY JEAN. I'll hunt it up. I'd like some help, though.

TEACHER. Sounds like a reasonable request. Who'll volunteer? O.K., Ben, John? Fine, and you, Sue? Good. Now for the rest of you, before tomorrow be on the lookout for articles about traffic safety, accidents—anything that has to do with the subject and bring it in

Now, what do you recall about traffic accidents and safety regulations in our community? (*Discussion continues for remainder of period.*)

The next day, Mary Jean and her committee outline their search. The information they found in the Safety Council yearbook was presented

in chart form. The students had written the essential 1956 traffic information on the chalkboard:

Age 15–24 killed in auto traffic collision—3480
Age 15–24 killed in speed-caused auto accidents—3900

JOHN. We don't like to see teen-agers included in the 15–24 age group. You know 15-year-olds can't drive.

TEACHER. How about special-permit drivers?

JOHN. I guess you're right.

SUE. I have two clippings—one about a teen-ager. (*Teacher nods, Sue reads.*)

ART. I've located one. (*Reads.*)

TEACHER. None of these people planned on cracking themselves to pieces, no one plans on having an accident.

JANE. People seem to act different when they get behind the wheel.

HUGH. They sure do. Just thinking about those new models—310 horsepower, hard-top convertibles—makes you want to push your foot to the floor and whoom—down the road you go!

JOHN. Every year they're putting more horsepower into them, too.

The discussion of new models continues. The girls are particularly impressed by the color, the chrome trim, the interior upholstery. The boys talk of hot-rod "strip-downs," piston displacement, and horsepower ratings.

The teacher leads the discussion around to:

1. The automobile as a marvel of engineering.
2. The automobile as a means of convenience and enjoyment.
3. The concept that modern inventive genius has created wonderful tools for communication and transportation, but that each new invention is accompanied by a directly related series of new responsibilities.

TEACHER. And with the modern automobile has come our present-day system of highways. All this has happened so rapidly that we have spent too much time enjoying automobiles and not nearly enough analyzing our real responsibilities if we are to use the automobile intelligently.

I've found a film which dramatizes the situation too many drivers find themselves in as soon as they leave their usual role of "well-thought-of pedestrian" and slide into the driver's seat. This film deals with the subject in a humorous manner. I leave it to you to find its more subtle message.

(*The room is darkened, and the film* Motor Mania *is shown (Fig. 15.6). Lights go on when the film ends.*)

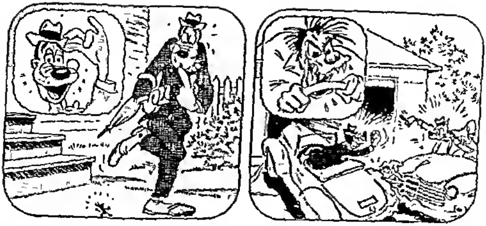


Fig. 15.6. *Motor Mania (Sound, Color, 8 min., Walt Disney Productions) is the story of kindly Mr. Walker who, as a pedestrain, "wouldn't hurt a bug." When he slides behind the wheel and roars into traffic he becomes Mr. Wheeler, unbelievably transformed into an arrogant, reckless, rude, primitive creature.*

SUE. That's exactly what I've been trying to say—people are different when they are driving.

HUGH. When they're sitting behind 310 horses!

BEN. I say again, it's the adults who cause all the accidents.

MARY JEAN. No, you can't, not after the figures we found on that—teen-age drivers behave the same way.

JOHN. This film was a lot of fun—all of us were laughing and giggling about it, but I think it's a very serious thing, this killing off thousands each year, and I'd like to know who's going to do something about it.

TEACHER. You're saying that teen-agers have a responsibility to take some action in social planning? *(John and others voice their agreement.)*

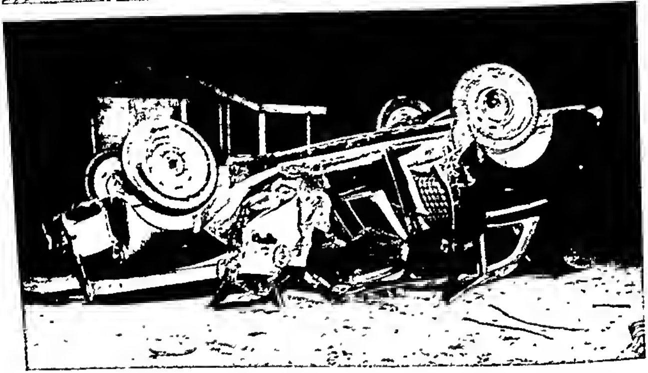
Yes, I heartily agree. If you are going to take part in community life and planning, it's time we start. *(Pause.)* But what can you do? This is a national problem. You are just one small group. *(Silence and a pause.)* Think about it—if you could do anything you wanted to as a group of young citizens in this immediate community, what would you do? We'll talk about it tomorrow.

One thing more. I've been busy collecting some data of my own. I'll show them to you tomorrow.

(Next day.)

TEACHER. I want to show you a group of photographs. A few weeks ago I went down to the newspaper office and to the traffic bureau of the police department. I asked the men at both places if they would save current traffic accident pictures for me. As you know, modern traffic control methods include making photographic records of traffic accidents. Well, I not only got many pictures from which I've selected those involving teen-agers, but

Fig. 15.7. Head-on at 50 miles per hour and out of control. The local newspaper or traffic bureau takes pictures like these as part of its accident reporting. Such pictures are available to student committees or teachers in most communities. Made into 2" x 2" slides, they can be projected on the classroom screen as dramatic and highly visual object lessons for viewing and discussion by the entire class.



Lieutenant Andrews volunteered to come out when we were ready to discuss the pictures. I now introduce the Lieutenant.

LIEUTENANT. I've been hearing about your traffie safety study, and I'm happy to be able to help you with it by bringing you some recent information about accidents here in ______. (*The lieutenant continues his report.*)

Now for the photo slides. (*Room dark, slide projector on.*)

These two cars were involved in a side head-on collision during passing. The left-hand car pulled out to pass; at the same time the approaching car did exactly the same thing. Result—collision at high speed. Six high-school students were injured; all were riding in the car on the right. It's remarkable none were killed. Two are still in the hospital in very serious condition.

Next slide. In this case the car was traveling at a high rate of speed and

couldn't make a turn. It rolled over three times; three passengers were thrown clear and badly injured. The driver, a high-school junior, was killed, died on the way to the hospital. (*The lieutenant continues with more slides.*)

TEACHER. All these accidents took place in or near our own community.

LIEUTENANT. In a three-month period—all involved teen-agers. Two killed, fourteen injured—three very, very seriously.

JOAN. Why, it's worse than war, and— Well, why hasn't more been done?

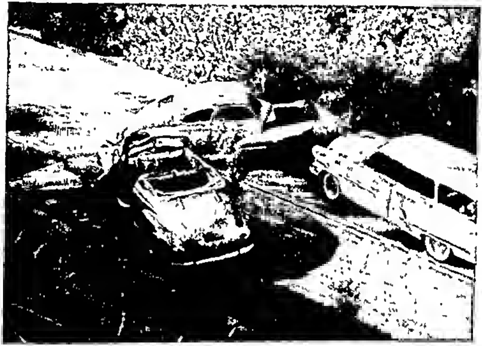


Fig. 15 8. Representative of several suitable films is this collision scene from *Chain Reaction*.

JOHN. I guess it happens so much and so often that—well—we're just used to it.

TEACHER. We set out to find more information about traffic safety. As I listen to you, I can tell that you have been very impressed, but what do you want to do about it?

DICK. I think we ought to let the rest of the school in on it.

TEACHER. How can we do that?

JOAN. The Student Council is responsible for three auditorium programs this semester. Why not ask them to plan one of them around the problem of traffic safety?

JOHN. And use the film we saw.

TEACHER. There are many other good films. You may want to go farther afield in your search. Maybe we can locate a better one.

SUE. That's a good idea—a program in the "aud," and by all means we should use a film.

HUGH. We can use some of the safety statistics we found, too.

BEN. There are lots of chart materials and art supplies up in the art room. Why couldn't we make a safety poster our project?

TEACHER. A good idea, and I am sure that Mr. Rankin would accept that as an art project. Hugh, will you help Ben with that? (*Hugh nods assent.*) Now, here's a list of additional films on safety: *Chain Reaction* (Sound, 13 min., American Transit Company); *Drunk Driving* (Sound, 20 min., Teaching Film Custodians); *Fatal Seconds* (Sound, 10 min., Aetna Casualty & Surety Co.); *Hit and Run Driver* (Sound, 20 min., Teaching Film Custodians); *Last Date* (Sound, 20 min., Lumbermen's Mutual Casualty Co.); *Live and Let Live* (Sound, Color, 10 min., Aetna Casualty & Surety Co.); *You Bet Your Life* (Sound, 10 min., Progressive Pictures); *Your Driving Habits* (Sound, 15 min., United World Films).

Who would like to serve as a preview committee?

A preview committee is named. Two days later the committee reports their choice of *Last Date*, the story of "teenicide—the art of killing yourself before you are twenty. You use an automobile to do it." The car accident in this film was caused by the wild driving of a hot-rodder. Because it is so applicable to a typical high-school situation and so dramatically describes the effect of this one accident on these teen-agers and their families, the film is selected for the general auditorium program which will be introduced with charts and slides, and a brief panel discussion on the growing incidence of teen-age automobile accidents.

Fig. 159. Enlisting teen-age interest in traffic safety and driver education courses is a key responsibility of secondary education today.

This is followed by the showing of *Last Date*. At the end of the film, a panel of students discusses its implications and suggests further activities which the entire student body can take part in—safe driving days, accident-free days, a student council safety court, a faculty-supervised hot-rod club, and an "It's Smart to Drive Safe" club, including as many

of the school's "big wheels" as will volunteer for the drive toward decreasing traffic accidents.

As a parallel to student interest in a program for safe driving, the teachers, working with students and officials of the local American Automobile Association, have instituted driver education courses as a regular part of the high-school curriculum. (See Fig. 15.9.)

HIGH-SCHOOL MODERN LANGUAGES—ABOUT FRENCH

Foreign-language instruction should receive increased emphasis in our schools as the need for better understanding of our neighbors throughout the world becomes more widely recognized. This need is well phrased in a *Wisconsin* curriculum bulletin:

"Americans have always been handicapped in their international relationships not only by their lack of linguistic training but also by their lack of contact with any way of life different from their own. This gap in their education has resulted in an immaturity in point of view that is incompatible with the world leadership that the United States is now called on to assume."[10]

Function of Modern-Language Teaching

Knowledge of a foreign language as an isolated academic skill clearly has little to offer toward a better understanding of the world we live in. Modern-language teachers recognize their function as one of developing an understanding and appreciation of other peoples through their language. Such knowledge is best acquired by living in a foreign land and learning the language, customs, problems, and viewpoints at first-hand.

For most of us, however, the way to acquire this understanding is to visit the country vicariously by such means as literature, pictures, films, and records—in short, to see and hear the people as they are at home. In either case, a working knowledge of the language will contribute a great deal to the realism and value of the experience.

The Learning Problem

Modern-language instruction has two aspects, the linguistic and the cultural. The linguistic or technical aspect includes aural comprehen-

[10] Wisconsin State Department of Public Instruction, Coöperative Educational Planning Program, *Modern Languages in a Modern Curriculum*, Curriculum Bulletin No 23, 1950, p. 8.

sion, oral facility, reading ability, and ability to write the language. The cultural side is concerned with providing useful and stimulating information about the history, geography, art, music, economy, living standards, and traditions of the country. Such knowledge makes possible the building of desirable attitudes such as sympathetic understanding and appreciation.

These two aspects are not only interrelated but also integral parts of the same process. Both are taught as natural parts of the whole experience. Grammar may be emphasized today, culture tomorrow; but in the long run a language is best learned in a framework of experiences which make the people who speak it come alive.

The teacher of a high-school French class, for example, arranged to have a French chef from a local hotel visit the class one day. The chef could speak virtually no English, and the pupils were taking first-year French; consequently the teacher had to help a little. She reported the pupils' amazement and delight when they discovered that they could actually converse in French with a real live Frenchman. Such experiences can have immeasurable value in adding zest and purpose to the learning of a foreign language.

As in any other subject, interest and learning go hand in hand in a modern-language class. How do you arouse and maintain interest in language study? Perhaps we can get some useful ideas by looking in on a class whose teacher, Professor Laura Johnson of the Wisconsin High School at the University of Wisconsin, has had marked success in imbuing her pupils with genuine interest in and enthusiasm for modern-language study.

The unit on French Canada on which the class is working comes near the beginning of the second semester of high-school French. When the class begins, Miss Johnson directs the pupils' attention to a map in the front of the textbook.

"Some of you may wonder at times why we should study French. One reason is suggested on this map. What do you notice there? James?"

"There are quite a few American cities with French names like Detroit, St. Louis, Joliet and Racine."

"Fine. What else do you notice? Elaine?"

"There seem to be more French names in Wisconsin than in other states."

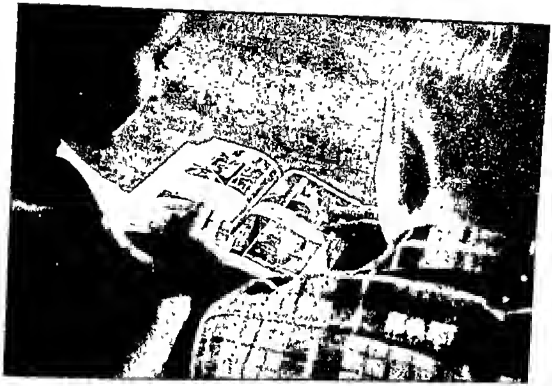


Fig. 15.10. Pictures provide background atmosphere and meaning to language study.

"Yes. As a matter of fact there are many cities and towns in Wisconsin with French names. This map shows only a few. Can you think of others? Will you write them on the board, Doris? We'll help you with the spelling."

A list of a dozen communities is written quickly on the board. As ideas begin to dwindle, Miss Johnson asks who would like to study a map of Wisconsin and make up a more complete list. Several boys like the idea and promise to report the next day.

"Now does this raise any questions in your minds? Janet?"

"Well, I think it might be rather interesting to know how some of these places got their names—like Eau Claire and Fond du Lac for instance. You're used to hearing these names and don't really think much about them. At least I never have before."

"It makes me wonder why we have so many French names in Wisconsin," added Bob. "I know we have a lot of Germans around Milwaukee, Norwegians around Stoughton and Swiss people over around Monroe,

but I've never heard of any large number of French people here in the state."

With such leads as these, the lesson on Les Français en Amérique gets under way. For several days the class reads and talks about early French explorers like Cartier and Champlain, Marquette and Joliet, and La Salle and Tonty. The textbook discussion of these explorers is in the form of interesting conversational stories which involve both geography and history and likewise provide the material for work on pronunciation, usage, and grammar. An old map of the explorers' routes, a song, and several pictures showing French influences in America are also used (Fig. 15.10).

During this phase of the work, both pupils and teacher gather illustrative material for a bulletin board display. Postcards and magazine pictures of French Canada, dolls and rugs made by peasants in the Gaspé area, and photographs taken by several pupils' families who toured the region are used. Some of this material is used as a frame of reference for vocabulary drills and oral practice.

After six chapters have been read, Miss Johnson inquires if the class would enjoy seeing a French film about the area they have been studying. "Oui, Mademoiselle," they answer.

Using the Language Film

So that the film will have worth-while results rather than providing merely a pleasant interlude, Miss Johnson plans several days of activities around it.[11]

On the first day she reads the film narration to the class, writing new words on the board for the pupils to copy and study before the film is shown.

On the second day a film on French Canada[12] is shown twice, with time given between showings for questions and clarification. After the second showing the class is asked to repeat phrases remembered from

[11] See Laura B. Johnson, "Mechanical Aids for Learning Languages," *French Review*, October, 1949, pp. 37–39, for discussion of a similar film lesson.

[12] *French for Beginners* (Sound, 10 min., B&W, Carl F. Mahnke Productions).

"This film presents a good picture of the life, customs, architecture, and scenery of French Canada today. The vocabulary is based on words of high frequency and well within the range of first-year students. The sound track is clear, and the rate of speed keeps the content easily comprehensible throughout. The film is highly recommended for creating an interest in our neighbors to the north, and in developing pronunciation, oral comprehension, oral facility, and vocabulary."

the film or to make descriptive comments of their own in French. The pupils themselves are surprised at the number of phrases they are able to remember or to say in their own words; there are nearly twenty such statements from the class as a whole.

Prior to a third and final showing the next day Miss Johnson repeats much of the narration, particularly the sections with which the students had difficulty the day before, and again emphasizes the new words. This time, when the film is finished, she asks the pupils to write about what they have learned about French Canada from the film. Marilyn's is as follows:

le français

Je m'appelle Marilyn
mercredi, le 21 fevrier

1. Québec est en réalité (une) de partie de France dans le nouveau monde.
2. Les maisons sont trés vieille(s).
3. Les toits pointus et les rues étroites ont peu changé.
4. Les coutumes et les mœurs et (la) le religion ont peu changé aussi.
5. Voici un couvent Catholique.
6. On peut voir dans le village de petites églises.
7. Les paysages sont trés pittoresque(s).
8. "Vous pouvez arrêter ici pour mange(r) fumer, et vous reposer."
9. Les femmes se servent des mêmes rouets que leur mère et leur grandmère.
10. Voici un canot de bois.
11. Québec a été la scène d('une) bat(a)ille entre les Français et les Indiens.
12. La scène de la bat(a)ille est au'jourd'hui un parc.
13. Nous trouvons dans le parc une statue de Jeanne d'Arc.
14. Les habit(a)nts sont trés pittoresque(s).
15. Les Canadiens font cuire leur pain dans les fours.
16. Les tapis sont trés beaux.
17. Les gens sont fiers des tissages.
18. Il y a des chutes d'eau partout.
19. Le fleurie coule entre les hautes falaises.
20. Voici sa tombe.
21. Une cathédrale s'appelle Ste. Anne de Bea(u)pré.
22. On peut voir beaucoup (de) chutes d'eau.
23. Dans le canot vous pouvez pêcher.

Marilyn is one of the better students. Her list of statements, by actual count, has only fifteen minor errors, including nine in spelling or gender, three omitted accent marks, and three omitted prepositions or articles.

Robert, an average student, writes fifteen statements with only minor mistakes (such as French children themselves often make) on such things as agreement of adjectives, and verb endings. The important point is that he is enjoying the satisfaction that comes from putting into French what has meaning to him.

Using Folk Songs on Records

Before beginning this unit the pupils learned "Alouette." They enjoyed hearing it in the film. On the fourth day of work on this part of the unit Miss Johnson brings in four records of French-Canadian folk songs

Fig. 15.11. Foreign languages, literature, and songs can be heard in any classroom by means of foreign-language recordings. What other means of recording and playback can be used?

such as "Vive la Canadienne" and "A la Claire Fontaine."[13] The words are before the pupils when they listen to the records (Fig. 15.11), and after each record they are called upon to pronounce the words as they heard them. Miss Johnson calls attention to such details as linking, elision, mute *e*'s, and pure vowel sounds.

[13] Victor Recordings. "A la Claire Fontaine" and "Vive la Canadienne" sung by Le Quatuor Alouette, Montreal, Nos. 56-5103 A & B; "C'est l'Aviron qui nous mène" and "Youppe, Youppe, Sur la Rivière," sung by Les Grenadiers Supérieux, Nos. B-1269 A & B.

After mastering these points, the pupils sing along with the records and become familiar with the folk songs they like best. The piano in the classroom is used to accompany them after the songs have been learned.

Language Application

As a culminating activity a charming French-Canadian woman is invited to come to the classroom on the fifth day to talk with the pupils and answer questions they have prepared in advance. Their great surprise and delight on discovering that they can understand and be understood by a native French woman would warm the heart of any teacher. But more than that, this experience supplies a purpose and a realism to language study which could be gained in no other way than by visiting the land where the language is spoken.

Evaluation

What of the outcomes? Does the procedure Miss Johnson uses really lead to more effective language learning? Are the time and energy spent in the activities warranted? Let Miss Johnson herself answer:

"Although these activities occupied the major part of five class periods, I do not feel that any time was wasted, nor that any basic objectives of a language course were even temporarily neglected. On the contrary, such humdrum tasks as increasing vocabulary, improving pronunciation, developing oral facility and aural comprehension, were translated into pleasant and stimulating activities by the effective use of mechanical aids."[14]

The reader will not fail to note that the kind of outcomes just described are not achieved simply by flicking the switch on a projector or turntable. The stimulating guidance of an expert teacher who understands boys and girls and their interests is constantly evident. That such a teacher should whole-heartedly accept and use audio-visual materials in teaching modern languages is significant.

Using Other Audio-Visual Materials

We have seen how one teacher, in teaching a unit on French Canada, used the textbook, maps, recordings, pictures, handcrafts, a motion picture, and a native French-Canadian to give vitality, interest, and effec-

[14] Laura B. Johnson, "Mechanical Aids for Learning Languages," p. 39.

tiveness to her class work. She might also have used many other materials and techniques, such as realia, radio programs, recordings, etc.

A teacher of Spanish in a junior high school in California describes the effectiveness of a "Spanish" store much like the one where functional English and arithmetic are practiced by elementary-school pupils. This store used cans, boxes, and bottles which had contained favorite foods, stuffed cellophane bread wrappers, wax fruit from the ten-cent store, and pictures of meat from refrigerator advertisements. Simple, indeed, but apparently effective. "After many years of teaching," says this teacher, "it still surprises me how much longer they seem to remember it [Spanish] and how much more fluent they are in its use when it is actually associated with the object, person or situation to which it refers."[15]

A college professor of German comments on the effectiveness of a series of radio programs prepared and broadcast by his class. "For the first time," he says, "at least in the case of some students, the grammar book became alive and German a living and functional thing. . . . No other class had ever developed *Sprachgefuhl* so early in the year and to a finer point than this class did."[16]

Linguaphone records have been used for many years in foreign-language instruction. These and other more recently developed courses that are on records offer such advantages as native speakers, repetition, and opportunities for guided imitation wherein students copy the speaker's intonation and pronunciation.

Publishers of elementary language textbooks are now producing records that are correlated with the textbooks. Some film producers are likewise producing records to accompany such films as *Une Famille Bretonne*[17] and *La Familia Sanchez*.[18] It is to be hoped that more language

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[15] Mabel Claire Keefauver, "The Use of Audio-Visual Aids in the Study of Spanish in the Junior High School," *Education*, October, 1947, p. 121.

[16] William Fraunfelder, "Radio as a Teaching Device in German," *German Quarterly*, January, 1951, p. 35.

[17] *Une Famille Bretonne* (A Lesson in French), Sound, 10 min., EBF.

This is the story of the film *French Children* told in simple French by a teacher-narrator who was born in France. In the present tense and without any subjunctives, the narration is directed at beginners and provides valuable practice in understanding spoken French. The film depicts family life on a farm in Brittany, showing the work done by each member of the family; it also includes scenes of the village school and a neighboring town. A recording of the French narration accompanies the film for practice and review.

[18] *La Familia Sanchez* (A Lesson in Spanish), Sound, 10 min., EBF

This is the story of the film *Spanish Children* told in simple and slow-paced Spanish. The

recordings, correlated closely with text and film materials, will be made available.

In addition to other advantages, the use of earphones with records holds considerable promise for individual and group study in libraries and classrooms. Furthermore, teachers report that recordings seem to carry a certain authority and validity for the students which they themselves lack. This somewhat unjust comparison might be attributed in part to student familiarity with teachers and in part to the fact that there is no way of arguing with a record. Whatever the reason, the fact remains that records are a source of stimulation of which the teacher can make good use.

The magnetic tape recorder has the great and unique value of permitting the student to hear himself as he actually sounds to others. It can be used in a variety of interesting ways in improving aural comprehension and oral facility; moreover, it relieves the teacher of some of the need for endless repetition. It is excellent for recording group songs, choruses, and rehearsals of any sort, as well as for individual remedial work on pronunciation. Miss Johnson's class, for example, prepared a program and recorded it on disks for the pupils of a school in Germany; final rehearsals and refinements were all worked out with a tape recorder. The resulting enthusiasm and interest in the project were reported to exceed the most optimistic expectations.

Although a project like that just mentioned is considerably out of the ordinary, pupils generally derive much stimulation from any use of a tape recorder. The fascination of hearing one's own voice played back, the complete objectivity of the instrument, and the close attention typically given it by everyone present add a dramatic quality which appeals to the "ham" in all of us. Far from being undesirable, this is a characteristic which an alert teacher puts to good use.

The language teacher who conceives of French, German, Spanish, and other modern languages as a means of communicating with and understanding the world in which we live has much to gain from audio-

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vocabulary and sentence structure meet the needs of beginners As the child watches real Spanish people going about their daily tasks, he listens to a description of what they are doing in the language they speak. The film provides a delightful visit with a rural family of southern Spain, with particular emphasis on the activities of the children. A 12-inch record, in Spanish, accompanies the film for practice and review.

visual materials. Probably no other subject in the curriculum can profit more from the effective use of these dynamic tools of learning. In the words of the Wisconsin Curriculum Bulletin: ". . . Through the use of this type of equipment a modern language becomes a 'social study' in the broadest sense of the word and is linked to almost every subject in the curriculum and to almost any interest that the student might have. Such a program does not omit the basic grammatical aspects of the language but vitalizes them through dynamic contact with the language as it is used by a foreign people."[12]

Fig. 15 12. The simple visual approach has proved effective in teaching German vocabulary.

HIGH-SCHOOL BIOLOGY—ABOUT *LUMBRICUS*

"Have you ever been curious about worms? Aside from the fact that they are good for fishing bait, earthworms are really quite fascinating. They have a rather remarkable ability, for example, to grow a new head or tail if a hungry robin happens to pull off the old one." Thus Mr. James begins his biology class one morning.

"Even though worms are not much to look at there *are* ways in which they resemble *us!* You don't believe it? Well, let's see. Some of you seem to have some ideas on that. Jerry?"

Jerry thinks that maybe worms have stomachs. Jane says that she sometimes hunted night crawlers on the lawn with her dad when she was a little girl and remembers that they pulled back into the hole in a hurry when the flashlight beam hit them, so they must have pretty good muscles.

"Yes!" agrees Bill. "And they've got nerves, too, or some kind of feeling

[12] Wisconsin State Department of Public Instruction, *op cit.*, pp. 16–17.

system, else they wouldn't thrash around on a hook like they do."

Bill's remark draws suppressed squeals from several of the girls in the class, and grins from the boys.

Mr. James smiles and continues.

"Good points, all of them. Can you think of any others?" He moves to the chalkboard and writes "Digestive System," "Muscular System," and "Nervous System."

Further discussion suggests that worms must have some means of reproduction, so he adds "Reproductive System" under the other terms.

Judging that this line of questioning has gone far enough to establish a connection with things already known, Mr. James takes another tack.

"There are some other rather unusual things that we could learn about earthworms. For example, how they work their way through the soil, what they eat, and particularly how, aside from bait, worms are vitally important to you and me."

With this lead, the discussion proceeds for a time along lines intended to do two things: (1) to arouse further interest in the subject of earthworms and (2) to establish a purpose in studying them.

Using a Film for Introductory Purposes

Before interest begins to slacken, Mr. James brings the introductory discussion to a close and suggests that they summarize the questions that have been raised. This results in a list of specific questions, such as:

1. How do worms work their way through the soil?
2. Why are earthworms important to us?
3. What do they eat?
4. How do they reproduce? Do they lay eggs?
5. What happens to earthworms in the wintertime?

With the period now about half over, Mr. James says, "Thinking that you might be interested in the subject of earthworms, I arranged for a film that may help us answer some of these questions. It's a good film and I think you will enjoy it. Keep in mind the questions we have here and see if you can find some of the answers."

The projector has been set up and threaded ahead of time by one of the several operators in the class, for the showing of this film has been

scheduled previously. The dark shades are pulled quickly and the film, *Earthworm,*[29] is shown.

After the film ends, Mr. James asks how many have found answers to their questions. About half the pupils raise their hands.

"What was the difficulty for the rest of you? Jean?"

"Well, I found some of the answers all right, but there was so much there that we hadn't talked about that I got mixed up, I guess."

"Ralpb?"

"I didn't see anything about what worms do in the wintertime."

"Tony?"

"There were quite a few names that were new to me. Maybe that made it hard to follow—I don't know."

"How many of you found it interesting even though you couldn't follow everything in the film?" This time there is general assent.

"That's fine. We'll discuss those questions tomorrow. Meantime it would be a good idea to find what your text has to say about the questions. The reference is on the board. There is also a list of interesting articles posted in the library; you may want to read them while we are studying earthworms."

Use of Model and Chart

The next day when the class comes into the room, a large-scale model of an earthworm is on display and on the front wall is a good-sized wall chart. Mr. James has also put several colorful pictures on the bulletin board under the heading, "How Does the Earthworm Live?" The display is only partially completed, but several pupils stop to look at it.

Discussion gets under way promptly on the questions raised the day before.

"Who can explain how the worm moves about? Victor?"

"They crawl along on some kind of feet—I think the book called them 'bristles.' They act something like hooks. The worm books onto the ground witb his back bristles and pushes forward with his head and

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[29] *Earthworm*, Sound, B&W, 20 min., British Information Services.
It describes the internal structure by means of dissected studies and illustrations. Digestive, circulatory, excretory, and reproductive systems are stressed. Animated diagrams of the processes of coition, egg laying, and cocoon formation are presented, the film ends with the birth of new individuals.

stretches out. Then he hooks onto the ground with his front bristles and pulls his back part up to the rest of him."

"That's very good, Victor. Who can show us these bristles on the chart?"

Jane points them out on the wall chart, which is large enough to show such details quite clearly.

Someone asks how the bristles are controlled. This, in turn, leads to a consideration of muscles and nerves and whether or not the earthworm

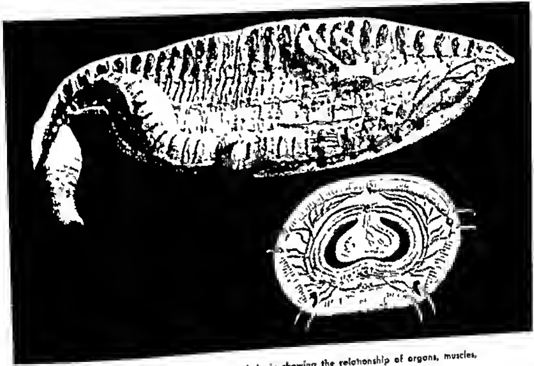

Fig 15.13. How can a model be of particular help in showing the relationship of organs, muscles, nerves, and blood vessels?

has a brain. The model (Fig. 15.13) is helpful in identifying muscular, nervous, and circulatory systems, because it shows the interior structure of the worm in three dimensions. Mr. James refers from wall chart to model and back again repeatedly during the discussion.

Pupil Participation

Several of the boys volunteer to bring in some worms for closer examination. Study of these worms results in a variety of interesting observa-

tions as to how they crawl, the lubricating liquid on their body surface, and the girdle.

A few worms are placed in a battery jar full of damp earth and left for several days. Occasionally a worm is seen burrowing its way through the soil next to the glass. Carefully removing a section of the soil after it has dried out somewhat makes visible a network of little tunnels. Several boys check the entomology journals to discover the importance of earthworms in ventilating and constantly mixing the soil.

Laboratory Possibilities

By this time Mr. James feels that there is sufficient interest and information to warrant dissecting a number of worms. When he suggests this, he gets a good response from about a dozen pupils. He does not urge the more reluctant students to do the dissections themselves; instead, he suggests that the class work in pairs so that those who do not participate directly can observe.

If the experience is to have value, Mr. James knows that a few guideposts must be set up. Otherwise, cutting up a worm may prove to be an end in itself rather than a means to a better understanding of earthworms.

"Before we start dissection, does anyone have a question? Ralph?"

"I'm not sure I know how to go about it—just how to start, I mean."

"That's a good point, Ralph. We need to know that, of course. Any other questions? Judy?"

"Well, I think we need to know what to look for, too—more than just in general, that is. Otherwise we might miss something or cut through it without seeing it."

"Very good, Judy. How many would agree with Judy? Quite a few would."

Jean somewhat reluctantly raises her hand.

"Mr. James, I know this is silly, but won't this be terribly painful for the worms? I mean that—well, it seems rather inhuman to just cut up live worms to see what's inside."

"I'm very glad you asked that, Jean, because it hadn't occurred to me and doubtless others feel the same way. Actually these worms we will dissect are specimens which have been chloroformed and preserved in

alcohol for just this sort of work. We could use live worms but we would chloroform them first. That is a painless way of killing them.

"Now Ralph thinks we need to know more about how to dissect a worm and Judy says that we need to know what to look for when we do this. Can anyone think of a good way to answer these questions?"

Using the Film for a Second Purpose

Someone quickly suggests that they again see the part of the film in which an expert is dissecting a worm. Mr. James agrees but takes the opportunity to say that a number of technical terms are involved. These terms—"cuticle," "epidermis," "esophagus," "larynx," "crop," "alimentary canal"—must be understood if the dissection is to be followed. They are thereupon discussed briefly and the pertinent section of the film is shown.

After this, the dissection process is discussed and the students are ready to go to work in the laboratory. Their work on dissection answers many questions but raises others which may become the basis for further activity: "How long does a worm live?" "What other kinds of worms live in the soil?" "Does the earthworm do any harm to crops?" "Can you get too many worms in a given piece of ground?" "What keeps worms from drowning when it rains?" "How do they breathe?" and so on.

Each question may be investigated by an individual or a group. Some leads will prove more useful than others for Mr. James' objectives in this study of earthworms, but he encourages the pupils to track down the solutions so that their curiosity will be satisfied. At appropriate points he provides for summaries, for integrating what has been learned into clear concepts. These, in turn, are applied to generalizations such as adaptation to environment, food-getting processes, locomotion, reproduction, and defenses against natural enemies. Mr. James also plans for tests of one kind or another to measure progress and the effectiveness of the methods he is using.

Initial Planning—How This Lesson Came About

It will be interesting to turn back the calendar a few days to see how this lesson came to be.

Mr. James, like all teachers who are approaching a new unit of science work, had to find practical answers to the questions: (1) What learning

difficulties are involved in this study of earthworms? and (2) How can these difficulties best be met?

Looking at it from the pupil's viewpoint, as every good teacher does, he lists the following practical difficulties:

1. While somewhat familiar to most pupils, earthworms are naturally neither attractive nor interesting to the average youngster.
2. Most of the earthworm's life is spent underground, out of sight and out of mind. Probably most of my pupils have never considered the earthworm as in any sense valuable to man or as typical of a class of animals. How can these phenomena be shown effectively?
3. One can best understand the structure of the earthworm by dissecting it. This will attract some students but repel others. How can I change the latter attitude? Also how can sufficient skill in dissection be developed without spending too much time on it?

As solutions to the above, Mr. James draws up the following plan of attack:

1. Start with what the pupils know about worms and appeal to the children's curiosity about themselves and the world around them. Motivate them with one or two striking and unusual facts about worms and base the discussion on known similarities to other animals.
2. Since we do not see earthworms close up very often, I'll ask some pupils to bring some to class and put them in a battery jar that contains some earth. Then we'll see what they do to the soil. Use a wall chart for general structure, and a model for structural relationships. Use the *Earthworm* film for introductory overview; show it again later for detail. Arouse curiosity questions prior to showing the film; follow the film with a discussion of these, and plan for further activities.
3. These "further activities" should lead to a consideration of dissection. By now, if earlier steps have been well handled, some will go along with the idea. Don't force it; let the other pupils observe. Show part of the film to demonstrate dissection processes. Discuss vocabulary before seeing the film. Suggest that dissection be followed up by notebook drawings.

This, in part, is the way one teacher went about the learning problem in his biology class. Various other ways might work equally well, for

teaching is an art, and as an art it has no rigid rules of procedure. Good teaching does have sound fixed principles, however, which are based on the nature of the child and on how he learns. Two of these principles are: Think always in terms of the pupil and his needs, and make the learning experience realistic and vivid to him by every possible means.

Prominent among these means are the audio-visual materials used by Mr. James and his class. Note that he introduced them naturally where they would do the most good. In no way did he minimize text and reference materials, but he recognized that the study of earthworms also requires appropriate audio-visual materials including the worms themselves.

Note also that neither by word, thought, nor action did Mr. James suggest, as sometimes happens, "Now that we've seen the film, let's get back to the lesson." The film *is* the lesson; the text assignment *is* the lesson; the chart, the chalkboard, the model, the worms and the other materials that have been or will be used—all are integral parts of the lesson and were so regarded by both him and the pupils.

By being thus used, the materials of instruction can reach a new "high" in effectiveness. Audio-visual materials, like the reading materials which are carefully chosen and used well in terms of the student's needs, will thus come of age. When they function at full capacity, they become more than simply aids or crutches for either pupil or instructor. They become true media of communication for both learning and teaching.

SUMMARY

The most effective use of audio-visual materials of Instruction is attained when they are selected and used in terms of their known value in creating or re-creating realistic and interesting learning experiences.

The teacher assumes several key responsibilities when selecting and using audio-visual materials in the classroom. Among them are (1) definition of learning goals, (2) selection of learning experiences, (3) correlation of appropriate learning experiences, and (4) guidance of the class in using these materials in accordance with the best research and utilization principles.

Audio-visual materials are means of enriching learning opportunities. It is the teacher, however, who supplies the skill, imagination, and guidance which mean the difference between successful and mediocre use of audio-visual materials.

Suggested Activities

1. Visit classrooms to observe how audio-visual materials and techniques are being used. Select classrooms which are close to or identical with your professional training or teaching interests.
2. Use audio-visual materials or techniques in your own day-to-day teaching or practice teaching.
   a. Set up objectives or goals.
   b. Preview and select instructional materials.
   c. Plan introductory interest-inciting activities.
   d. Provide for the planning of purposes by the pupils.
   e. Secure selected audio-visual instructional materials and arrange for their actual use.
   f. Tentatively plan follow-up activities.
   g. Objectively evaluate outcomes in terms of pupil interest, understanding of new information, pupil initiative in pursuing self-inspired activities, etc.

   This last may be an objective measure of your grasp of the significance of the role of audio-visual materials and techniques in implementing the curriculum and improving instruction.

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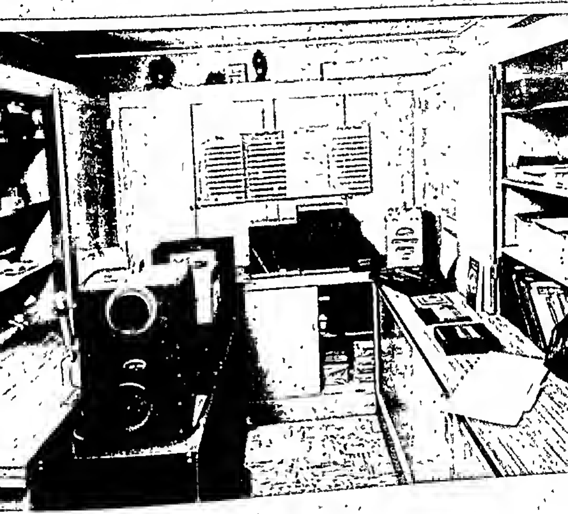
16.



Local School Administration and Audio-Visual Materials

ORDINARILY THE PROGRESS OF BASIC NEW APPROACHES TO ACCOMPLISHING the goals of education is marked by the passage of decades before the idea has attained widespread acceptance by parents, the public, students, and professional educators.

The audio-visual education idea, however, has been accepted in American education with unprecedented speed within a very short space of time. Evidence of this is available in many forms, one of which is presented in Fig. 16.1.[1] Other kinds of evidence include:

1. A rapidly developing body of research findings which establish, with validity and reliability, that the well-planned use of carefully selected audio-visual materials can improve the rate and quality of classroom instruction.

2. The appearance of audio-visual courses in over 500 of the major American universities and state and private colleges. Basic courses have such titles as Methods in Audio-Visual Instruction, Improvement of Instruction Through Audio-Visual Means, Curriculum Enrichment Through Audio-Visual Methods, etc.

3. The continued growth of the Department of Audio-Visual Instruction of the National Education Association, established in 1946. Both membership and the budget increased rapidly, the latter 300 percent by 1956.

4. The steady increase in the number of new staff positions in state departments of public instruction, public schools, colleges, and universities, entitled director, supervisor, or coördinator of audio-visual instruction or education. In 1955, 993 school districts which responded in a

[1] These data are to be found in *Audio-Visual Education in Urban School Districts, 1953–54*, Research Bulletin of the National Education Association, October, 1955.

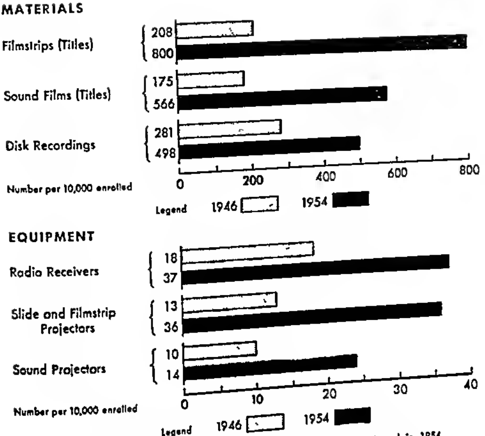


Fig. 16.1. Audio-visual materials and equipment available in 1946 and in 1954

national survey of audio-visual practices reported 346 formally budgeted and staffed departments of audio-visual instruction.[2]

Any area of American educational practice that enjoys such rapid growth and importance merits serious consideration in the planning that is done continuously by the school board, the school superintendent, and teachers. For this reason, the following pages are devoted to a discussion of the administration of audio-visual instruction in the school.

SOME PRINCIPLES OF ADMINISTRATION

As is true of any phase of local school administration, the administration of audio-visual materials and equipment demands widespread appreciation of their use and importance. Among the groups which should

[2] *Ibid.*

share this appreciation and responsibility are (1) the board of education, (2) the superintendent of schools, and (3) the teacher.

THE ROLE OF THE BOARD OF EDUCATION

The period 1945–1955 witnessed a sharp increase in the school use of audio-visual materials and equipment. One of the major reasons for this was the experience so many parents had had with these materials in the armed forces. During 1945–1955 many school board members who had served in the armed forces raised a question as to why these materials were not used more extensively in the local schools. This familiarity with their potentialities was sometimes greater among board members than among superintendents, and often prompted enthusiastic members to participate in the selection of such materials as projectors, screens, maps, globes, and charts. This practice is most unfortunate, for it violates the basic function of a school board—policy formulation.

The board of education is a policy-making and not a supervisory body. It is the board's function to make sure that things get done—not to do them. But since policy formulation, educational as well as financial, is one of its functions, a board of education has a unique responsibility with respect to both the selection and the utilization of audio-visual materials and equipment. This is so because of the unusual contribution of audio-visual methods to the teaching and learning processes.

Since the board of education is basically concerned with the fullest development of children and the maximum effectiveness of all the staff, particularly the teachers, it is especially important that it make sure that sufficient funds are provided for necessary and adequate audio-visual materials and that the teaching staff is fully conversant with and highly skilled in using them. Thus, although it is essential for board members to have an intimate understanding of the importance of these materials, they should be purchased only when recommended by the superintendent and supported by specifications.

THE ROLE OF THE SUPERINTENDENT

The point of view or attitude of the superintendent has a marked influence on the whole question of audio-visual materials and equipment. The superintendent must realize that, regardless of the size of the school system, the administration of audio-visual materials must be specifically

assigned. This assignment should not be "tacked on" to an already full-time job. In small school systems it may constitute a part-time job, but in larger systems several persons will be required for it.

It has become customary to give some such title as "Director of Audio-Visual Education" to the person immediately responsible for the administration of audio-visual materials and equipment. This title is justified if there is a clear understanding of the function of such a person. To be sure, this individual should possess and exercise leadership qualities in connection with the use of audio-visual materials and equipment; however, directors of audio-visual education are basically coördinating and service agents for classroom teachers.

Screening films and filmstrips and examining maps, globes, charts, models, exhibits, recordings, scripts, etc., should be recognized as regular teaching duties, as are reading, planning class activities, and making out examinations; no special allotment of time should be made for such work. On the other hand, a few teachers should be assigned to special committees concerned with the examination and appraisal of audio-visual materials which demand time far beyond that required in their regular line of duty and their teaching load should be reduced accordingly.

Superintendents must recognize that if audio-visual materials and equipment are to be of the requisite quality and amount, adequate funds must be available. Some superintendents have stated that they favor extensive use of such materials but have made no attempt to arrange for them in the budget.

One of the major responsibilities of school superintendents is to make sure that boards of education understand the function and values of audio-visual materials and equipment. In a conference with a board of education it was strongly recommended that these techniques be used more widely. The president of the board, a highly intelligent and successful businessman, immediately commented, "Oh, we could make the teaching easier, couldn't we?" "No," was the answer, "you would make both learning and teaching more effective." There still prevails in too many quarters the impression that films and filmstrips are nothing more than school movies. To make sure that the boards have deep insight into the underlying reasons for the wide use of these materials in school, superintendents would do well to arrange for actual class demonstrations of

their use. Such a demonstration might well be the reason for calling a special meeting of the board.

Constant appraisal of the results of the audio-visual program should be carried on by the superintendent. Only in this way can he have reasonable assurance that the school funds appropriated for such purposes are being efficiently used.

THE ROLE OF THE TEACHER

The teacher has long been recognized as practically the determining factor in child development so far as the school is concerned. Teaching may well be defined as the stimulation of learning. Learning at its best is the process of discovery. It is therefore clear that to a high degree the effectiveness of both teaching and learning is determined by the kind and adequacy of the instructional materials that are available. This is especially true of audio-visual materials and equipment.

In terms of educational significance, one of the most important aspects of the administration of these materials and equipment is their selection. Teachers should have a large part in selecting them; but the ordering, payment, storage, inspection, and mechanical maintenance, as well as the provision of proper conditions under which to use them, are not functions of teachers. The staff members who are responsible for overall management and service maintenance should assume these functions.

Long ago it was proved that both teachers and children must participate in the selection of textbooks if the wisest choice is to be made. The sound selection of audio-visual materials demands the judgment of both teachers and children just as does the sound selection of textbooks.

The selection of learning materials and equipment is a joint responsibility of pupils, teachers, supervisors, and administrators. It does not involve one or the other; all must help. When differences of opinion arise, a practical compromise must be worked out and arrangements made to determine the educational results of the choices made.

There is some evidence that when principals and superintendents have failed to make adequate budgetary provisions for audio-visual materials, the teachers themselves have not forwarded requests for the material required. Although the actual preparation of the school budget is ultimately in the hands of the superintendent, good budgetary procedure provides for teacher participation in this function; hence it be-

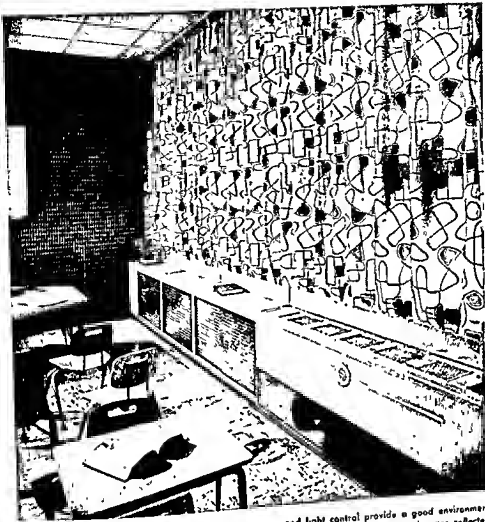


Fig. 16.2. In this classroom, ventilation, temperature, and light control provide a good environment for audio-visual learning. What school policies and administrative planning and execution are reflected here?

comes the teacher's duty to inform the superintendent just what materials are needed for effective work.

Teachers must realize that audio-visual materials are unique instruments for both effective teaching and effective learning. They must also be keenly aware of the constant supply of new films, filmstrips, and other audio-visual materials. Perusal of bibliographies of films, filmstrips, slides, maps, globes, charts, models, and exhibits should be just as strong a habit among a teaching staff as the habit of reading bibliographies of textbooks, pamphlets, and other similar materials.

PRACTICES IN THE ADMINISTRATION OF AUDIO-VISUAL MATERIALS

"We have an audio-visual program at our school," a parent told a visitor. "Every Friday afternoon at two o'clock the children all gather in the auditorium to see movies."

"We have movies in the auditorium every noon," the visitor replied. "Some of them are very good and the children who stay for the lunch period put their time to good use. I suppose one could call that an audio-visual program, too . . ."

Actually these are only casual beginnings. These too-often-heard descriptions of an "audio-visual program" are one extreme of what such a program often is but should not be. What is needed are well-organized, thoughtfully planned and administered programs for improving instruction through the use of modern audio-visual materials and techniques.

Where to begin? Where to approach the problem of administering an effective and useful audio-visual program?

Administering an audio-visual program involves:

1. Survey and appraisal of audio-visual methods.
2. Plans for meeting audio-visual instruction needs.
3. Execution of audio-visual policies and plans.
4. Evaluation.

Current thinking about audio-visual instruction varies all the way from entertaining children with occasional film programs in the auditorium to providing improved instruction such as has been described in earlier chapters. Regardless of where a given school system is with respect to the use of audio-visual methods, the whole problem may well be approached by means of an initial comprehensive survey of the thinking, needs, and practices of the teachers, administrative officers, the school board, and the community.

SURVEY AND APPRAISAL OF AUDIO-VISUAL METHODS

The superintendent of schools, principal, or supervising officer may initiate the survey of current audio-visual practices and needs of the local school system. Although the school administrator should be the motivational force behind such a survey, he may wish to delegate this responsibility to a committee of interested teachers and parents. If the local school system already employs an audio-visual coördinator, di-

rector, or supervisor, this survey responsibility ordinarily will be his.

Because schools function in the best interests of the young people in a community, the parents, the public, and their representatives—the members of the board of education—may be invited to participate in the survey. Since audio-visual instruction is in essence a way of providing learning experiences in the classroom, the survey should call for reactions and reports from all or from representative members of the school's administrative and teaching staff.

Mechanically, the survey questions should be brief and clear so that they will measure the reactions objectively.

Lay and School Board Participation in the Survey

In the days of Horace Mann, a voice in the formulation of school policies was a prerogative prized by the people for whom the schools were organized. Today, there is renewed interest in school affairs. Effective public participation in school affairs, particularly by school board members, is best promoted if *interest is answered with information that enables the best action to be taken.*

Fig 16 3. Three ways of providing for the use of projected audio-visual materials. Top: An adopted area; center: the multi-purpose room; bottom: the light-controlled classroom. What advantages and disadvantages are involved here?

The following survey questions[3] are suggested as some to be asked

[3] Adapted from *How Good Are Our Teaching Materials*, Working Guide No 8, National Citizens Commission for the Public Schools, 2 West 45th St., New York 36, N.Y., 1955.

school board members, members of parent-teacher associations, and other interested lay groups:

1. Does our school system have an audio-visual director, supervisor, or coördinator?
2. If not, do we need one?
3. What effect will a complete audio-visual program have in more effectively achieving the current goals of education?
4. What audio-visual materials do our teachers use?
5. Do they have access to as many audio-visual materials as they believe are needed?
6. What problems do our teachers face when they attempt to use audio-visual materials?

It is likely that additional questions will result from the answers to such survey questions. In that case, the superintendent, the audio-visual supervisor, or teachers should be called upon for clarification or to present research evidence or describe current practices.

Leadership in the Survey

The superintendent may be the motivational force in the survey of the school's audio-visual program, or he may delegate this responsibility to the audio-visual supervisor or coördinator. Regardless of who is responsible, such questions as the following will help determine current provisions for audio-visual instruction:

1. Are inter- and intra-school faculty meetings so organized that the role of audio-visual materials in education is periodically considered?
2. Does the administrative leadership coördinate, share, and distribute information about audio-visual education to the staff by means of staff publications, service pamphlets or bulletins, or information about sources, such as films and books, which is scheduled for circulation among the staff or deposited in individual schools for staff reference and use?
3. Is free communication of questions and ideas about such a program possible and encouraged between classroom teachers and administrative officers?
4. Do teachers as well as all other members of the school's instructional and administrative staff have an active voice in determining what kind of audio-visual program the school shall have?

5. Is a long-range planning program set up to take care of present and future needs in relation to equipment, materials, curriculum integration, community resources and facilities, and in-service training?
6. Is interschool visitation encouraged so that teachers can observe effective classroom demonstrations of audio-visual techniques?

If the answers to such questions as the above are in the affirmative, a good foundation is being provided upon which to base total formulation of audio-visual procedures. A negative answer to any question is a clear indication of need in that particular area.

The Teacher's Survey

An effective program of classroom-centered audio-visual instruction begins in the classroom, and the teacher is the one who guides it. Hence any investigation of audio-visual instructional techniques must begin by examining his role and the teaching procedures he employs.

A school may be well supplied with audio-visual equipment and materials and yet have a very inadequate program of audio-visual education. Conversely, a school may be very poorly equipped in this respect and yet, because of a teacher's imagination and ingenuity in using these limited facilities, rank high as far as achieving reality in teaching is concerned.

Too often a teacher says, "I am very interested in audio-visual education, but the materials cost money and we have little money." But there are many things a good teacher can do with materials already at hand—the chalkboard, displays, trips into the community, the construction of models, specimens brought to the school—to achieve a high level of effective audio-visual utilization.

The highest level of audio-visual teaching is attained when an enlightened teacher is given a complete array of audio-visual tools and materials with which, through imagination and ingenuity, to create a realistic learning environment.

The following questions will enable teachers, supervisors, and administrative officers to determine the prevalence of audio-visual materials and the efficiency of their use:

1. Does the teacher use the following in meeting the classroom learning needs of pupils?
   a. The chalkboard.

b. The bulletin board.

c. Maps, charts, globes, models.

d. Files of flat pictures.

e. Slide projector (3¼" x 4").

f. Combination 2" x 2" slide and filmstrip projector or equivalent.

g. Motion-picture projector: Silent .... Sound .... Kinescopes .... Telefilms ....

h. Opaque projector.

i. Phonograph.

j. Radio.

k. Combination speed turntable 33⅓ and 78 r.p.m.

l. Sound recording device (tape preferred).

m. Television.

n. Community study (bonded carrier provided).

2. Does the teacher evaluate and select the audio-visual materials used? No one shares the teacher's unique position. He knows intimately the instructional needs of the learner. He can judge best how these needs can be met through carefully evaluated and selected audio-visual materials. Thus, he is in the best position to judge their effectiveness.

Because of the nature of films, kinescopes, filmstrips, recordings, and transcriptions, definite opportunities must be provided for the teacher to preview, audition, and examine them. Two conditions should be met: The teacher should be informed of his responsibility for evaluating and selecting audio-visual materials, and the principal or superintendent should provide mechanical facilities and in some cases additional time for these functions.

a. Does the teacher serve on committees for evaluation and selection?

b. Does he use planned periodical preview sessions?

c. Does he keep permanent evaluation records of previews?

d. Does he recognize his responsibility for coördinating good materials with the curriculum?

e. Does he continually search for material that will best serve instructional needs?

3. Does the teacher know and employ tested techniques for using audio-visual materials effectively? Utilization techniques vary widely from school to school. To some schools a merely casual "showing" of audio-

visual materials in the auditorium represents "use," whereas in reality the careful use of films, kinescopes, telefilms, filmstrips, tape recordings, charts, models, etc., already described in earlier chapters is rightfully called "use."

The following will allow the teacher to estimate the utilization level he is achieving:

a. Has the teacher a definite purpose in using audio-visual materials, such as arousing interest, developing habits and attitudes, imparting information, demonstrating techniques, enriching, or establishing a meaningful vocabulary?
b. Do the audio-visual materials form an integral part of the unit?
c. Does the teacher plan for effective use of audio-visual materials?
   (1) Does he regularly preview materials a day or two before using them in class?
   (2) Does he make use of available teaching guides?
   (3) Does he recognize the need of preparing audio-visual presentation by
      (a) Exploring pupil interests and needs?
      (b) Supplying interesting supplementary explanations?
      (c) Removing vocabulary difficulties?
      (d) Assigning definite responsibilities to be assumed as the result of seeing or hearing the materials?
      (e) Formulating the pupils' purposes in using the materials?
d. Does the teacher plan follow-up activities?
   (1) Is there opportunity for clarification, discussion, and further inquiry?
   (2) If the needs of the class warrant, is there opportunity for review?
   (3) Does the teacher encourage such follow-up activities as discussion, oral and written composition, objective tests, mural drawing, model construction, choral speaking, creative dramatization, etc.?
   (4) Are the pupils encouraged to voice their evaluations of materials?

4. Is the teacher alert to the physical aspects of audio-visual presentation? Very frequently, the physical conditions in which audio-visual

materials are used are such that pupils do not associate their use with regular classroom study procedures.

Such questions as the following will reveal the extent to which the classroom is a true audio-visual learning environment:

a. Is the teacher able to secure needed audio-visual materials and equipment for use in the home classroom on the day and at the exact time he feels the children will profit most from their use?

b. Is the seating such as will encourage the effective use of projected and audio materials? (See Fig. 13.23.)

c. Is the teacher alert to the need of maintaining the classroom at the optimum temperature of 68–72 degrees?

d. Is the teacher on the watch for acoustical deficiencies such as are caused by hard-surfaced walls and ceilings?

e. Does he know that simple cloth hangings, acoustical tile, or better placing of "speakers" will help overcome poor acoustics? (See Chapters 10 and 11.)

f. Is the classroom equipped with light-control blinds, drapes, curtains, screens, etc., so that projected materials can be effectively used?

g. Are adequate loud-speaker ducts, wall outlets, etc., available?

5. Has the teacher recently attended an in-service audio-visual training institute, class, or special seminar?

Audio-visual methods of instruction are changing rapidly. The appearance of new films, kinescopes, filmstrips, maps, and transcriptions makes it desirable for the teacher to study such materials continually. A teacher who has had professional training in audio-visual methods should keep up-to-date by means of in-service training. The rapid progress being made in the field makes in-service study opportunities almost mandatory if the teacher is to keep informed.

The extent to which the answers to the above questions are in the affirmative indicates whether teacher-pupil use of audio-visual methods is effective. When questions are answered with a "no," the need for study and planning is evident.

A survey of the current level of use is the logical first step in improving an audio-visual program. The possibilities for improvement thus indicated must be acted upon. Teachers can help determine needs, but it

is the responsibility and obligation of the principal and superintendent to take action regarding these needs.[4]

PLANNING TO MEET AUDIO-VISUAL INSTRUCTION NEEDS

When unfulfilled needs are discovered, plans should be made which will fill them as adequately as possible. While parents, school board members, and teachers can locate needs, it is the responsibility of the superintendent, with the assistance of principals and audio-visual coordinators, to set in motion plans for action.

The administrator has authority to marshal the entire staff of a local school or school system to participate in the formulation of policies which affect the instructional program. Policies relating to audio-visual instruction should include materials, equipment, physical facilities, funds, professional improvement, and other closely allied problems.

Policy Formulation and Planning in Action

Once a teacher realizes that he is expected to take part in policy formulation, he seizes upon this new concept of democratic administrative procedure with avidity. A strong partnership between teaching staff and administration tends to result.

From this partnership may accrue many advantages, the greatest of which is a strong feeling of mutual responsibility for an improved school program. The coöperative formulation of policies by staff and administration must give way to speculation about audio-visual instruction and its techniques, its many aspects and its relationships to interest and sense of accomplishment on the part of the pupils, all of them factors that will ultimately influence the final judgment of the planners. The administrator will have his ideas tested by "classroom wisdom"; the teacher will experience the reverse process.

Of the many policy-forming procedures that exist, the following will be described: (1) the audio-visual building committee, (2) the school system audio-visual planning committee, and (3) the curriculum committee.

[4] See the following sources for additional approaches to the survey and evaluation of audio-visual developments: *The Audio-Visual Program*, Bulletin 218, State of Indiana Department of Public Instruction, 1956, and *Evaluation Criteria of Audio-Visual Instructional Materials Services*, Committee of Accreditation of Secondary Schools, National Education Association, 1950.

1. Teachers who naturally are interested in audio-visual techniques for improving instruction might well become core members of a *building committee.* Professionally interested teachers may wish to study the effectiveness of their own teaching. In this case, the administrator's role is to assist them in acquiring professional reading material, current audio-visual materials for preview, and demonstration equipment. Policies formulated at building committee meetings may include the following:

a. Teachers should meet to preview and select new audio-visual materials.
b. Preview and selection should be based on how new audio-visual materials may be correlated with and improve existing course-of-study plans.
c. Recommended audio-visual materials should be secured by the administration for interested teachers and pupils (through either rental or purchase).
d. Teachers should not use audio-visual materials in instruction unless they have become well acquainted with them through examination, study, or preview.
e. Teachers should use audio-visual materials in true "study" situations.
f. Audio-visual equipment should be easily accessible to teachers.
g. Classrooms should be so equipped as to make possible ready and effective use of audio-visual materials.

Once policies have been established, they should not be followed time without end; rather, they should be reëxamined periodically. Continual scrutiny of existing policies should be encouraged, and suggested changes should be tested before being finally rejected or accepted.

2. If it is desirable for supervisors, principals, and teachers within a single school to work together in developing policies for effective classroom procedures based on audio-visual techniques, large school systems can accomplish the same results by means of an *audio-visual planning committee.* In school systems with larger teaching staffs it may be desirable to have policy-formation activities carried on by such a committee, composed of representatives of the various grades and subject areas of the school system as a whole.

3. There are few school systems today in which a *curriculum committee* does not exist. Since the role of audio-visual techniques is an ex-

pression of the implementation of curriculum responsibility, it follows logically that existing curriculum committees should assume the next stage of responsibility, namely, investigation of the audio-visual materials and techniques that can bring about a more realistic understanding of the objectives encompassed in the curriculum.

Just as the curriculum committees seek to define what pupil experiences should be included in the sequential plans that are then called curriculum, so they may proceed to the next step, coördinating the audio-visual materials and techniques with curriculum objectives.

It is reasonable to expect that the curriculum committee on primary reading will be completely informed regarding the newest audio-visual materials, which will then become an integral part of reading comprehension. Any curriculum manual or course of study invariably contains lists of supplementary and basic readers. Today no curriculum implementation plan is complete that does not refer to transcriptions, filmstrips, 16 mm. sound films, charts, aod maps.

Plans once made and found acceptable to the school board, the administration, and teachers must finally be reconciled with the funds available for the entire school program. The frequency with which needs are expressed, as well as their importance in enriching learning opportunities for large numbers of pupils, should determine priorities.

EXECUTION OF AUDIO-VISUAL POLICIES AND PLANS

Execution of an audio-visual plan is a day-by-day process. How can a teacher have reasonably immediate access to a sound projector? How can an audio-visual committee secure books about audio-visual techniques? Where can a teacher get *this* film and *that* filmstrip? How can he be given regular opportunities to preview new audio-visual materials? Where can he "see" the best procedures for the intelligent and effective utilization of new audio-visual materials in a given subject area?

Questions such as these are concerned with action, not with planning. Execution is thus the stage at which thoughtful planning is put into practice.

In a small school, the administrator himself may, for budgetary or other reasons, assume responsibility for the execution of the audio-visual plan. In this case it will fortunately or unfortunately have to compete with other responsibilities for whatever attention a busy superintendent

or supervising principal can give it. Such an administrator may be highly interested in an audio-visual program but may not ever completely realize it because of the many demands on his time.[5] Figs. 16.4 and 16.5 show two of the forms used in a suggested system for administering an audio-visual program in a small school. A form evaluating slidefilms and

EDUCATORS AUDIO-VISUAL MATERIAL INVENTORY, USE, AND EVALUATION SYSTEM

Equipment

PROJECTION: (Circle) Film, Filmstrip, Slide, Opaque, Other ______

NON-PROJECTION. (Circle) Radio; Recorder-disc, tape, wire, Photographic; Stereoscope, Transcription Player; Portable Public Address System; Other ______

Make ______ Model ______ Weight ______

Size ______ Serial Number ______ Other Identification ______

Source ______ Address ______

Original Cost ______ Date Purchased ______ Where Stored ______

Cost of Repairs and Maintenance:

Date	Parts	Labor	Express	Total

Evaluation of Use:

	Excellent	Good	Poor
Illumination			
Portability			
Sound			
General Condition			

Recommendation for Replacement:

Scheduled for replacement on (date) ______

Same make and model ______

Same make, Different model ______

(specify) ______

Different make and model ______

(specify) ______

Remarks ______

Fig. 16.4. Inventory, use, and evaluation form for audio-visual equipment.

one for evaluating slides, maps, etc., are almost identical to that in Fig. 16.5.

Administrative duties and functions may be assigned to an audio-visual teacher-director, a building audio-visual committee, or an audio-visual director (full or part-time depending on circumstances).

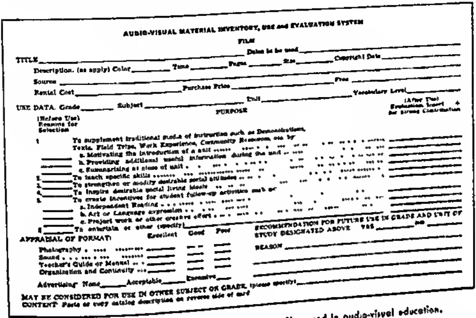
The Audio-Visual Teacher-Director

Interest in audio-visual techniques and methods may be the single most important reason for selecting a teacher to work in a given school.

As the teaching staff carries out its day-to-day assignments, it is inevitable that over a period of time new interests will develop, new abili-

[5] See *An Audio-Visual Materials Inventory, Use and Evaluation System*, Educator's Progress Service, Randolph, Wis.

ties come to light, and therefore a change in assignment will be desired by given individuals. Administrators and teachers alike should recognize such shifts in interests and capacities; and to the degree that it is feasible, work should be reassigned where this seems likely to increase the utilization of the capacities of the staff.


AUDIO-VISUAL MATERIAL INVENTORY, USE and EVALUATION SYSTEM

FILM

Date to be used ____

TITLE ____ Copyright Date ____

Description. (as apply) Color ____ Time ____ Pages ____ Size ____

Source ____ Free ____

Rental Cost ____ Purchase Price ____ Vocabulary Level ____

USE DATA. Grade ____ Subject ____ Unit ____

PURPOSE

(Before Use) Reasons for Selection

(After Use) Evaluation Insert + for Strong Contribution

1. To supplement traditional media of instruction such as Demonstrations, Texts, Field Trips, Work Experience, Community Resources, etc. by
   a. Motivating the introduction of a unit
   b. Providing additional useful information during the unit
   c. Summarizing at close of unit
2. To teach specific skills
3. To strengthen or modify desirable social attitudes
4. To inspire desirable social living ideals
5. To create incentives for student follow-up activities such as
   a. Independent Reading
   b. Art or Language expression
   c. Project work or other creative effort
6. To entertain or other (specify) ____

APPRAISAL OF FORMAT: Excellent Good Poor

Photography

Sound

Teacher's Guide or Manual

Organization and Continuity

Advertising: None ____ Acceptable ____ Excessive ____

RECOMMENDATION FOR FUTURE USE IN GRADE AND UNIT OF STUDY DESIGNATED ABOVE YES ____ NO ____

REASON ____

MAY BE CONSIDERED FOR USE IN OTHER SUBJECT OR GRADE, (please specify) ____

CONTENT: Paste or copy catalog description on reverse side of card

Fig 16.5 Inventory, use, and evaluation form for films used in audio-visual education.

A teacher who is given supervisory audio-visual duties certainly should have his total teaching load modified accordingly. Time is necessary for the many duties involved in executing audio-visual plans. A curtailed teaching schedule is usually the best way of balancing the overall load of an audio-visual teacher-director.

The position of teacher-director offers many advantages for audio-visual plans. It is the first step in executing a comprehensive audio-visual program, and it usually can be created without major budgetary changes.

The teacher-director often possesses many qualifications that are desirable in one who has audio-visual duties. Among them are (1) interest in audio-visual methods, (2) successful teaching experience, (3) knowledge of curriculum and of curriculum planning and revision, (4) knowledge of the problems confronting the teacher who attempts to implement the curriculum with realistic and meaningful audio-visual learning, and

(5) appreciation of the role of audio-visual methods in the improvement of instruction *per se.*

The Building Audio-Visual Committee

In any school there may be reasons why audio-visual duties may be assigned to a small committee of interested teachers rather than to an individual teacher. Interest in audio-visual methods, success in teaching, and willingness to serve may be among these reasons.

The procedures, limitations, and advantages just described in connection with the audio-visual teacher-director also apply in the present case.

Both these plans for executing audio-visual policies may be thought of as intermediate steps to the executive position of audio-visual director.

The Audio-Visual Director

Although the execution of audio-visual responsibilities can be provided for in many ways, the degree to which the duties and functions should be centered in one individual often means the difference between success and failure for a program. In urban communities or in centralized school districts with over 1500 pupils an audio-visual director seems an important and completely justified administrative appointee. On appointing him, the administrator can assign executive duties and functions to him in that field and expect that they will be effectively carried out.

The audio-visual director must be a combination of outstanding teacher, curriculum worker, subject supervisor, and general administrator. Above all, he must have as the center of his interest an abiding faith in the desirability of working side by side with interested teachers in furthering an understanding of the role of audio-visual materials and equipment in improving instruction in the classroom.

Among the specific qualifications which the director should possess are:

1. *Successful experience in classroom teaching.* In order to understand the problems confronting the classroom teacher who is desirous of making curriculum units meaningful to pupils, the audio-visual director should have had successful classroom teaching experience himself.

2. *Professional training in audio-visual methods, supervision, and administration.* Only through adequate training in audio-visual methods can a director keep abreast of the new materials, equipment, and tech-

niques which are being developed from day to day in this field. His responsibility calls for him to continue professional training, reading, and research investigations preferably within his own school system.

3. *Competence in curriculum planning and its philosophy.* The audio-visual director should be experienced in curriculum planning and implementation. Since the whole range of audio-visual methods is interwoven into curriculum planning and revision, it is unthinkable that the man who assumes responsibility for improving instruction has not had professional training and practical experience in curriculum planning. The field of audio-visual education is the implementation phase of curriculum planning. This being the case, the audio-visual director is continually confronted with problems and procedures, investigations and techniques of a curricular nature; hence he should be well versed in the principles and practices of curriculum planning.

4. *Ability to demonstrate audio-visual theories, plans, and techniques.* Too many self-styled audio-visual experts are merely operators of mechanical gadgets and other audio-visual paraphernalia. The audio-visual director should be able to "practice what he preaches." He should be able to demonstrate his ideas in actual teaching situations in almost any classroom. Here again, experience as a successful classroom teacher is a necessary prerequisite to his effectiveness.

5. *Continual professional contact with colleagues in connection with curriculum, teaching methods, and audio-visual education.* The audio-visual director must seek to be a constant contributor to the literature on audio-visual education and a participant in regional, state, and national programs.

6. *Ability to work well with lay people and with teachers, fellow supervisors, and administrators.* The director must be able to see the essential aspects of the audio-visual program in relation to all the other facets of the many-sided school curriculum.

The director's first responsibility is to assist the teacher to become more familiar with evaluating, selecting, and using audio-visual materials for improving the day-to-day learning environment he seeks to provide for his pupils. Administratively, the director may delegate interested teachers in the building to form a secondary core of supervisor-teachers; they may be called building representative, school representative, etc. This type of secondary organization is only a mechanical expedient.

The audio-visual director has many other responsibilities, including the following:

1. To assist teachers in defining problems of instruction and in discovering ways of meeting them through audio-visual materials and techniques.
2. To act as general information center so that the teachers will know whom to ask about problems concerning utilization, availability of materials, operation of equipment, etc. This function is often best served by a comprehensive program of in-service training which includes faculty meetings, work-study groups of teachers, and formally organized credit courses in audio-visual methods.
3. To acquaint his teaching staff with the newest developments in the field, such as new materials, new equipment, research findings, etc.
4. To foster interschool visits by teachers.
5. To advise the administration concerning needed audio-visual materials and equipment (and their estimated costs).

Only as the audio-visual director is successful in working closely with teachers, fellow supervisors, and administrators will he fulfill the specific duties and functions which the administrator has seen fit to assign to him. No director should ever lose sight of the fact that his job is never done, that new problems, new challenges are always ahead. His is the task of continually searching for means of improving instruction and for the more orderly revision and organization of curriculum responsibilities.

EVALUATION

In order to judge how well the execution of an audio-visual program is progressing, such questions as those suggested above for the teacher will be found of value by the administrator (see pages 517–520). To repeat: The test of a functioning audio-visual program is the classroom use of audio-visual materials and equipment. Therefore, the teacher's concern with preview and evaluation is also the administrator's. Similarly, the fact that an opaque projector, for example, is or is not available to a teacher at the exact time that the class can profit from it is the administrator's concern as well as the teacher's. It is for this reason that administrators must answer the same questions as the teacher, and must answer them in terms of the entire school system.

Although the evaluation of an existing audio-visual program may be made initially to determine its effectiveness, the process of evaluation is by no means limited to a single endeavor. Rather, it is a continuing function; it goes on daily, weekly, year after year. Evaluation can point the way to needed next steps. Constant reference to the questions listed above will reveal additional opportunities for improvement.

SOME PERSISTENT CHALLENGES TO AUDIO-VISUAL ADMINISTRATION

Audio-visual instruction is in the midst of healthy and rapid growth. Continued growth, however, will depend on the manner in which able and aggressive leaders in the field are able to meet some present problems for which workable solutions must be found.

In 1955, teachers in 630 urban school districts were asked what stood in the way of their using audio-visual materials and techniques.* Their reports in the order of frequency of mention follow:

"1. Adaptable instructional *space* is not available, or not at the appropriate time.
"2. Teachers are not qualified to use audio-visual materials.
"3. Materials and equipment are not available for use when needed."

Such reports clearly indicate some of the "next step" responsibilities for the audio-visual leader.

ADAPTING EXISTING CLASSROOMS TO AUDIO-VISUAL USE

The audio-visual leader should strive to make the classroom a place in which audio-visual materials may be effectively used.

Proper control of light and ventilation is mandatory. Ambient light—the light that comes into the room through pinholes in the shades, from flapping window shades, etc.—must be eliminated. Suitable mechanical ventilation should be installed and room lighting should be easily controlled by the teacher or pupils. The proper light levels for various projection conditions are shown in Fig. 16.6. (You can borrow a light

* *Audio-Visual Education in Urban School Districts, 1953-54*, Research Bulletin of the National Education Association, October, 1955, p 123

meter from a high-school science teacher or from your local power and light company in order to make these readings in your own classroom.)

Light levels can be controlled by means of slide draperies, roller shades, and Venetian blinds. Fabrics and blinds should be chosen on the basis

EXPERIMENTAL CONDITIONS

Size of classroom: 26′ x 32′.

Screen image: 4′ wide.

Six viewers in an area similar to that occupied by students for regular classroom viewing of projected materials (see Fig. 13.23).

STILL PICTURES

1000-watt opaque projector.

Less than 0.5 foot candle of illumination required for comprehension.

MOTION PICTURES

16 mm.; 750-watt projector; two-blade shutter.

Note: "Indistinct" refers to images whose main features are clearly distinguishable but the shadows in which are lost.

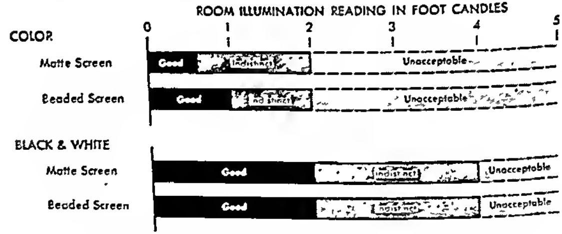


Fig. 16.6. Classroom illumination required for comprehension of projected pictures.

of their effectiveness in providing various light levels in the classroom. The hardware and fittings for them should be selected on the basis of ease of operation and probable freedom from mechanical difficulties.

Materials to darken the classroom should be colorful, attractive, and in harmony with the overall color and decoration scheme. Aluminized fabrics are opaque and at the same time colorful.

In this day of audio-visual techniques, no school superintendent should approve remodeling or new construction which does not provide

ceiling fixtures for hanging one of the various types of room light-control devices—interlocking blinds, jalousies, or smooth-running, single-line, opaque draw drapery of pleasing color.

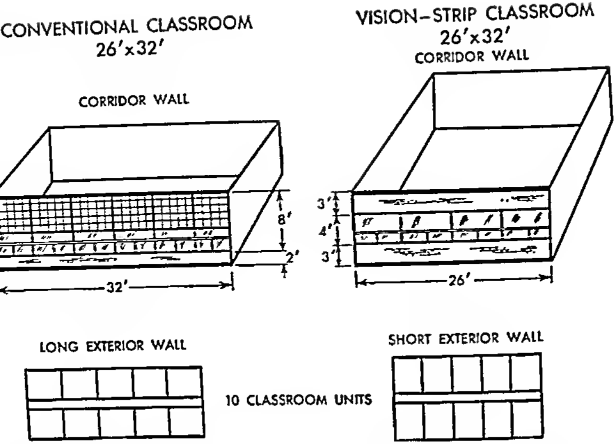
BUILDING NEW CLASSROOMS

According to the report of the 1955 White House Conference on Education, "Fifty thousand new classrooms are needed each year to house the rising enrollment, plus thousands more to replace buildings growing obsolete through more than twenty years of depression and war-time neglect."

It is estimated that, in order to meet the requirements for space which increased enrollment will make mandatory during the decade 1956–1966, one new classroom will have to be built approximately every 10 minutes, 24 hours a day, 365 days in the year.

Those who are responsible for planning audio-visual programs in buildings now under construction or to be erected in the future must present practical plans. Such plans must provide for the arrangement of the classroom and control of its ventilation and lighting in the interests of the

Fig 16 7 Any source of natural light can be inexpensively and efficiently controlled to permit use of audio-visual materials in the classroom. Light from windows can be regulated by draw drapes (top), blinds (center), or roller curtains (bottom)



Advantages and Disadvantages	Advantages and Disadvantages
1. High original building cost	1. Low original building cost
2. High maintenance cost	2. Low maintenance cost
3. High room-darkening cost	3. Low room-darkening cost
4. Natural light	4. Manufactured light
5. Flexible classroom use	5. Flexible classroom use

Fig. 16.8. A conventional and a vision-strip classroom. What possibilities for a classroom-contained audio-visual program do you see here?

best use of audio-visual techniques, and at the same time they must be acceptable to school administrators and architects who must reconcile adequate construction with existing budgets. For this reason, an audio-visual program ought not increase the school building budget but should work within the existing budget. The vision-strip classroom meets all these requirements to a very high degree.

The vision-strip classroom is the standard 26 x 32 feet. It differs from the usual classroom in orientation and in window treatment: the ex-

terior and corridor walls are the short walls, except on the corners of the building; and the windows run the width of the room but are only 4 feet high. This is in sharp contrast to traditional classroom windows, which vary in height from 6 to 9 or even 10 feet in some cases when combinations of clear glass and glass brick are used.

The vision-strip classroom has been built in the Minneapolis, Minnesota, and Madison, Wisconsin, areas since 1950. It was originally designed to combine low-cost construction with maximum flexibility in arranging classroom seating and learning activities. However, it has proved

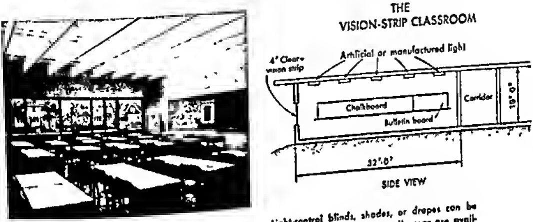


Fig. 16.9. Some details of a vision-strip classroom. Light-control blinds, shades, or drapes can be easily and inexpensively installed to permit easy adjustment of room light. Large wall areas are available for chalkboards and bulletin boards.

to be well adapted to the needs of a classroom-centered audio-visual program.

Ten traditional classrooms arranged as shown in Fig. 16.8 would necessitate 160 feet of corridor and 392 feet of exterior wall construction. Ten vision-strip classrooms of the same size would require only 130 feet of corridor and 344 feet of exterior wall construction—a considerable saving in original cost.

Annual maintenance costs also favor the vision-strip classroom. Hammel and Johnson's study[7] of comparative maintenance costs for four representative types of classrooms demonstrated that costs were from 5 to 10 percent lower for the vision-strip classroom.

[7] F. Richard Hammel and Lawrence E. Johnson, *Manufactured Light vs. Daylight for Schoolrooms*, Northern States Power Company, Minneapolis, 1955

The windows of the vision-strip classroom—26 feet wide by 4 feet high—provide good visual association with the out-of-doors, yet lend themselves to low-cost blinds or draperies for room light control. Artificial light is used to provide uniform lighting, since natural light is seldom adequate. Furthermore, because of its orientation, this classroom provides larger areas for chalkboard and bulletin board.

The vision-strip classroom may well be seriously considered among the many varieties of schoolroom plans now being studied, because it so effectively accommodates itself to the needs of audio-visual learning activities.

ADMINISTERING AN IN-SERVICE TRAINING PROGRAM

The responsibilities of the audio-visual director or coördinator in providing and staffing workshops, demonstrations, and opportunities to study research and materials of audio-visual instruction have been mentioned previously.

The teacher who was trained more than ten years ago rarely had opportunities for this type of study. Therefore, it is incumbent on the audio-visual director to provide such information for the members of the teaching staff, including (1) general information for those whose training did not include audio-visual methods, and (2) current information about new materials, equipment, and techniques for all the staff members.

EQUIPMENT NEEDS

It is unfortunate that necessary audio-visual equipment is not always available for use when desired. Several studies of the relationship between probable teacher need for equipment and the amount of equipment necessary to satisfy that need have been made. The recommendations made by one such study[8] embody what may well be considered minimum essentials for school systems interested in acquiring equipment for audio-visual instruction. The amount of this equipment that should be available is governed by whether each teacher can have the exact item for his class at the exact time he needs it.

Minimum equipment standards are particularly helpful in beginning

[8] Audio-Visual Commission on Public Information, "List of Minimum Requirements for

or substandard audio-visual programs. It should be recognized, however, that such standards are *minimums* and that *effective* use is the only significant measure of success once such equipment has been made available.

REPORTING TO THE COMMUNITY

"The schools have surely changed. Why when I went to school . . ."

This often-heard remark reveals that when adults think about the schools of today, they are actually recalling their last realistic acquaintance with school—the one they attended years ago. It is logical to expect, then, that the average adult, out of school for twenty years, will have little information about the school of today—its curriculum, instructional methods, etc.

What must be the average lay person's reaction when he hears about audio-visual techniques of instruction as they relate to contemporary school programs? How does he interpret the terms "visual education,"

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a School Audio-Visual Program, 1956," 250 West 57 St., New York, gives the following as basic minimum equipment:

	Basic Minimum Equipment
16 mm. sound projectors	1 per 300 students or major fraction thereof, at least 1 for each building.
Filmstrip and 2" x 2" projector	1 per 200 students or major fraction, at least 1 per building.
Opaque projector	1 per building.
Tape recorder	1 per 300 students or major fraction; at least 1 per building
Record player (3-speed)	1 per first-year class, 1 per 5 other classrooms, at least 2 per building.
AM-FM radio and TV all-channel receivers (where appropriate programs are available)	1 radio per 5 classrooms, at least 2 radios per building; at least 1 TV per building.
Overhead projector (7" x 7" or larger; one must be equipped to handle 3¼" x 4" slides)	1 per building.
Screens—square (60" x 60" or larger)	1 per each 2 classrooms.

Light Control (Basic Minimum)

There must be some means of reducing the light in each classroom sufficiently for satisfactory projection.

Personnel (Basic Minimum)

Someone must be made responsible for the audio-visual program in each building, and he must be given sufficient time during school hours to do a professional job.

"audio-visual instruction," "school films," "filmstrips," "kinescopes," "transcriptions," "models," etc.?

Systematically communicating to the lay public information about the school program is the responsibility first of the school administrator, supervisor, and teacher, and second of the other community agencies that are the avenues through which information is ordinarily disseminated—television, radio, and the press.

The graphic nature of audio-visual teaching materials and techniques makes reporting accomplishments in this field an interesting, easily explained type of information to bring to the attention of community groups. Among the several avenues for describing audio-visual materials and methods to the community are special educational celebrations, school staff reports, and the superintendent's annual report of school activities.

Special Educational Celebrations

The most universally observed opportunity for bringing the public into the schools is American Education Week which occurs each November. In line with the themes chosen for observation during this week, carefully chosen audio-visual materials may be used as part of the program.

American Education Week offers an opportunity to project or display representative audio-visual materials chosen from those actually used by children in their regular classroom work during that week. To show adult groups some of the filmstrips, slides, films, and other audio-visual materials which are being used in the social studies, science, mathematics, language arts, commercial subjects, industrial arts, or other subject areas is an extremely realistic way of demonstrating what modern audio-visual materials are like and what they can accomplish.

Choosing a representative 10-minute teaching film from each of two or three subject areas in which large numbers of the children are enrolled, and showing a cross section of such films to a community group will help the public realize the worth of one phase of an audio-visual program.

Short reports by teachers on the use of maps, charts, globes, films, filmstrips, slides, models, specimens, books, display boards, and chalkboards to improve instruction will further inform the community of the nature of the audio-visual teaching materials used in its schools.

School Staff Reports

An effective way to report on the use of audio-visual materials to the community is through actual classroom demonstrations. For a teacher and his pupils to present a typical lesson in which audio-visual materials are used gives as vivid and understandable an account of school methods as any that can be presented to adult groups.

A typical lesson in some subject area such as the social studies, science, mathematics, or language arts will do more to acquaint an audience with the role of audio-visual materials in the school today than hours of talk. The opportunity of seeing for themselves how pupils acquire information and understanding by using modern teaching tools is in itself an audio-visual experience for adults.

The Superintendent's Annual Report

The superintendent's annual report on school activities offers a natural opportunity for comment on the present status of audio-visual materials and equipment, and plans for future developments in this field. By means of well-worded explanations and representative pictures of these materials in use, the current audio-visual program can be described and additional facilities which may be needed can be recommended.

The Responsibility for Continuing Audio-Visual Reports

Because the process of education is of great concern to the American public and because that public has placed such continuing faith in the American system of education, it is the responsibility of professional school people periodically and systematically to report the techniques, aims, and procedures of the American school to the public it serves.

Because of this responsibility, persons interested in audio-visual education should assume their full share of responsibility for reporting systematically to the community the status of the work in this field and the progress that is being made in improving teaching techniques through the wise use of carefully selected audio-visual materials and equipment.

SUMMARY

The administration of an audio-visual program calls for many activities. Among them are the formation of a policy or plan, the assignment of definite responsibility for its execution, its actual execution, and the

responsibility for reporting progress to the instructional staff and the community.

There is no beginning or end to the many activities involved in planning and administering an audio-visual program. Rather, all the activities proceed simultaneously and necessarily continuously.

The beginning may be an appraisal of the current audio-visual program of instruction. In this appraisal the activities and responsibilities of the teacher, the supervisor, the administrator, the school board, and the community itself should be analyzed. Following the appraisal, possibilities for improvement should be studied by the entire school staff.

In the formulation of audio-visual policy and plans everyone on the staff should take part. Once the policy has been formulated, definite assignments of responsibilities should be made. Specific responsibilities may be assigned to teacher-directors, to members of an audio-visual committee, or, what is most effective, to an audio-visual director.

After the audio-visual program is in operation and the new plans have been carried out, study, appraisal, and revision of plans should go forward continuously.

Both teacher and pupils should participate in the continuing evaluation, selection, and utilization of such teaching materials as films, kinescopes, filmstrips, maps, charts, globes, radio, television, models, tape recordings, etc.

Because pupil activities are tangible evidence of the effectiveness of an audio-visual program of instruction, such activities should be continually studied and, most important, reported to the community.

Among the problems that confront the audio-visual director or coordinator are room light control, in-service training in methods of audio-visual instruction, and provision of the necessary equipment and materials in the amount needed. The current need for 50,000 new classrooms per year offers the audio-visual director the opportunity to help plan these new classrooms and hence provide for the use of audio-visual materials. He may well consider the vision-strip classroom because of its many advantages.

The final accomplishment of the audio-visual program can be judged by the activities that take place in the actual classroom under the direction of a skillful teacher. The effectiveness of such a program can be

measured in terms of its ability to present an interesting, vivid, and realistic series of socially important learning experiences to the pupil.

Suggested Activities

1. Use the teacher appraisal questions on pages 517–520 as the basis for an interview with a teacher in a nearby school. Record reactions to the various questions. Following the interview, report your judgment on such matters as:
   a. The part the teacher plays in helping to formulate audio-visual policy in his school.
   b. Methods of evaluating, selecting, and securing audio-visual materials for use.
   c. Methods of using these materials in the classroom.
   d. Accessibility of audio-visual equipment for classroom use.
   e. Physical facilities including seating, ventilation, acoustics, etc.
2. Arrange to interview teachers whose classrooms have been adapted to audio-visual use. Ask them whether they consider the classroom the best place in which to use these materials.
3. Interview several parents, neighbors, or businessmen. Ask such questions as these:
   a. How recently have you listened to or read something which reported on local school activities?
   b. What do such terms as these mean to you: "audio-visual instruction," "instructional motion-picture films," "filmstrips," etc.?
   c. In your opinion, what are the real contributions of the audio-visual program to the local schools? Its weaknesses?

   Study your interview reports and interpret the implications of the reactions. Are these people well informed about their school system's audio-visual program? What needs are reflected?
4. As a member of a committee, undertake a simple survey of nearby school systems that are comparable to your own local system. Address your inquiry, either personal interview or letter, to the superintendent. Keep your questions few, direct, and simple. Here are some suggestions:
   a. How many pupils are in average daily attendance?
   b. How many teachers are employed?
   c. How many films were purchased last year? Rented last year?
   d. What provisions are made for using educational television?
   e. How many 16 mm. sound projectors are owned? Opaque projectors?
   f. Are classrooms arranged so that projected materials can be used?
   g. Who selects films used in regular classroom work?
   h. Who administers the audio-visual program?

i. What amount is budgeted for audio-visual materials and equipment costs per year?

Study your returns and discuss the relative strengths and weaknesses of the audio-visual programs in these several school systems.

5. As a member of a committee, investigate the titles in the following bibliography. Report noteworthy ideas and information to your classmates.

Bibliography

An Audio-Visual Materials Inventory, Use and Evaluation System, Educators Progress Service, Randolph, Wis.

Audio-Visual Education in Urban School Districts, 1953–54, National Education Association Research Bulletin, October, 1955.

Audio-Visual Equipment Directory, The, National Audio-Visual Association, Inc., Evanston, Ill., 1953.

Audio-Visual Handbook, Oklahoma Department of Public Instruction, 3rd ed., 1954.

Audio-Visual Program Bulletin, The, Indiana Department of Public Instruction, 1956.

Caudill, William W., *Toward Better School Design*, F. W. Dodge Corp., 1954.

Engelhardt, N. L., Englehardt, N. L., Jr., and Leggett, Stanton, *Planning Elementary School Buildings*, F. W. Dodge Corp., 1953.

Hammel, F. Richard, and Johnson, Lawrence E., *Manufactured Light vs. Daylight for Schoolrooms*, Northern States Power Company, Minneapolis, 1955.

How Good Are Our Teaching Materials, Working Guide No. 8, National Citizens Commission for the Public Schools, 1955.

In-Service Education in Audio-Visual Methods, Michigan Audio-Visual Association, 1956.

Kinder, James S., *Audio-Visual Materials and Techniques*, American Book, 1950.

McKown, Harry C., and Roberts, Alvin B., *Audio-Visual Aids to Instruction*, McGraw-Hill, 1949.

Noel, Francis W., "Principles of Administering Audio-Visual Programs," *48th Yearbook of the National Society for the Study of Education*, 1949, Part I, chap. 10.

Planning Schools for Use of Audio-Visual Materials, No. 1 Classrooms, Department of Audio-Visual Instruction, National Education Association, 1953.

Planning Schools for Use of Audio-Visual Materials, No. 2 Auditoriums, Department of Audio-Visual Instruction, National Education Association, 1953.

Planning Schools for Use of Audio-Visual Materials, No. 4 AV Centers in Colleges and Universities, Department of Audio-Visual Instruction, National Education Association, 1955.

School Administrator and His Audio-Visual Program, The, Department of Audio-Visual Instruction, National Education Association, 1954.

School Research Theses, Bulletin No. 1, New York State Association of School Business Officials, Department of Architecture, Pratt Institute, 1956.

Source Lists

The following lists are intended to suggest some typical commercial sources of the various audio-visual materials discussed in this book. Numerous other sources such as government agencies, industrial concerns, airlines, railroads, and steamship lines are particularly valuable for flat pictures, posters, graphs, films, and filmstrips.

The Educators Progress Service, Randolph, Wisconsin, has a classified list of free illustrative materials including pictures, graphics, films, filmstrips, and some exhibit materials.

CHALKBOARDS; CHALKBOARD SUPPLIES

Chalkboards

Lastoplate Fiber Blackboard; Admiral Tempered Blackboard. Composition wood fiber base, sprayed or painted surface.
New York Standard Blackboard Co., Inc., 144 W. 18 St., New York 11, N.Y.

Miracle Solid Plastic Chalkboard. Matte surface.
New York Standard Blackboard Co., Inc., 144 W. 18 St., New York 11, N.Y.

Porcenell Chalkboard. Vitreous surface, steel base, magnetic.
Benjamin Electric Mfg. Co., Crysteel Division, Des Plaines, Ill.

Slate Chalkboard.
W. E. Neal Slate Co., 1121 Dartmouth Ave. S.E., Minneapolis 14, Minn.

SlatoSteel Chalkboard. Porcelain or vitreous surface, steel, magnetic.
Beckley-Cardy Co., 1900 N. Narragansett St., Chicago 39, Ill.

Chalkboard Supplies

Blackboard Drawing Set. Includes geometry and arithmetic shapes.
Teaching Materials Service, 914 North Ave., Beloit, Wis.

Blackboard Marking Set. Includes ¼-in. pen, semipermanent chalkboard ink, solvent for cleaning chalkboard.
Time-Saving Specialties, 2816 Dupont Ave. S., Minneapolis 8, Minn.

Blackboard Semipermanent Ink.

Time-Saving Specialties, 2816 Dupont Ave. S., Minneapolis 8, Minn.

Bulletin Board Styx. Adhesive wax.

Lea Audio-Visual Service, Albert Lea, Minn.

Magnets. Approximately ⅜ x ⅜ in.; strong enough to hold lightweight objects to steel chalkboards or metal display surfaces; 3¢ or 4¢ each.

Ronald Eyrich, 1091 N. 48 St., Milwaukee 8, Wis.

CLASSROOM LIGHT-CONTROL EQUIPMENT

(In each case, brochure and samples are available on request.)

Luther O. Draper Shade Co., P.O. Box 505, Spiceland, Ind.

Fabric draperies in light-proof black, both roller shade and "Pakfold."

Duracote Corp., Ravenna, Ohio

Coated fiber glass draperies; sag- aod stretch-proof; available in four weights and variety of colors.

Forse Manufacturing Co., 2347 Sullivan Ave., St. Louis 7, Mo.

Heavy-duty canvas draperies; tan, gray, or black; opaque or light-proof.

Hunter Douglas Corp. (Flexlum), 150 Broadway, New York 38, N.Y.

Venetian blind type, with spring-tempered aluminum slats in variety of colors. "Architectural Drawings of Installations" available on request.

Levolor Lorentzen, Inc., 720 Monroe St., Hoboken, N.J.

Venetian-type blinds, aluminum, decorator colors and textures.

Mackin Venetian Blind Co., 300 W. 6 St., Momeoce, Ill.

Venetian blind type.

Plastic Products, Inc., 1822 E. Franklin St., Richmond, Va.

Luxout plastic fire-resistant draperies, completely or partially opaque, in variety of colors; also hardware required for mouoting and operating.

Williamsburg Drapery Co., Inc., 819 W. Chicago Ave., Chicago 22, Ill.

Vinyl coated cotton, coated fiber glass; aluminized, if desired, for complete opaqueness; variety of colors aod patterns.

DISPLAY MATERIALS

Display Surfaces

Add-a-Panel Flannel Board:

E. J. Blosser Co., 2239 Oros St., Los Angeles, Calif.

Coheragraph:

John C. Winston Co., 1010 Arch St., Philadelphia 7, Pa.

Flannaroll Screens. Roll-up flannel board and story packets for reading readiness, language arts, social studies; elementary level:

Self-Teaching Aids, 9616 S. Normandie Ave., Los Angeles 44, Calif.

Flannelgraph Eye-Cue Visualalder Packets for Reading, Number Readiness, Language Arts:

Techni-craft, P.O. Box 1024, Petersburg, Va.

Kling-Tite Paper Surfacing:

Follett Publishing Co., Chicago, Ill.

Magnetic Boards. With materials useful in baseball, football, and basketball chalk talks:

Program Aids Co., Inc., 550 Fifth Ave., New York, N.Y.

Magnetic Display Boards. With letters, numbers, objects; primarily for reading readiness, language arts, phonics, etc.

Match-a-Tach, 26 E. Pearson St, Chicago 11, Ill.

Oravisual Folding Flannel Board and Display Tripod:

Oravisual Co., Inc., 321 15th Ave. S., St. Petersburg, Fla.

Pegboards. For wall, floor, or pedestal, in sizes ranging from 24 x 36 in. to 48 x 96 in.; also hardware required:

Demco Library Supplies, 2120 Fordem Ave., Madison 4, Wis.

Plastiknn Display Materials. Magnetic boards, adhering plastic surfaces, study materials, adhering alphabets, etc.:

Multi-Plastics Co., Box 316, 7332 Deering Ave., North Ridge, Calif.

Lettering Equipment

Cushman and Dennison Mfg. Co., 153 W. 23 St., New York 11, N.Y.

Flo-master pen for speed lettering, nibs from ⅛ to ⅜ in. wide.

E. Dietzgen Co., 2455 N. Sheffield Ave., Chicago, Ill.

Keuffel and Esser Co., 520 S. Dearborn St., Chicago, Ill.

Payzant lettering pens.

Mark-Tex Corp., 453 W. 17 St., New York, N.Y.

Tech-pen for inking glass, metal, porcelain, paper, plastic, cloth, etc, in colors.

Letters

Gummed Paper Letters:

Tablet and Ticket Co., 1021 W. Adams St., Chicago, Ill.

Pasteboard Letters:

Carlo's, 220 Fifth Ave., New York, N.Y.

Hilary Co., 141 Hilary Circle, New Rochelle, N.Y.

Redikut Letter Co., 185 N. Prairie Ave., Hawthorne, Calif.

Plaster Letters:

Hernard Mfg. Co., 923 Old Nepperhan Ave., Yonkers, N.Y.

Mitten's Display Letter Co., Fifth Ave., Redlands, Calif.

Plastic Lamination Material:

Glassoloid Corp. of America, 32 Wellington Ave., Clifton, N.J.

Plastic Letters:

W. S. Stensgaard & Assoc., 30 Rockefeller Plaza, New York, N.Y.

Wood Letters:

Manhattan Wood Letter Co., 151 W. 18 St., New York, N.Y.

New York Wood Letter Co., 18 Green St., New York, N.Y.

Models, Objects, and Other Three-Dimensional Materials

Milton Bradley Co., Springfield 2, Mass. Models, toys.

Central Scientific Co., 1700 Irving Park Blvd., Chicago, Ill. Models.

Clay-Adams Co., Inc., 141 E. 25 St., New York 10, N.Y. Cutaways, models.

Creative-Playthings, Inc., 867 Madison Ave., New York 21, N.Y. Models.

Denoyer-Geppert, 5235 Ravenswood Ave., Chicago 40, Ill. Models.

Educational Playthings, 20 E. 69 St., New York 21, N.Y. Models.

General Biological Supply House, Inc., 761 E. 69 Place, Chicago 37, Ill. Models, cutaways.

Imitation Food Display Co., 107 Lawrence St., Brooklyn 1, N.Y. Models of food.

Louis Paul Jonas, Sculptor, R.D. #2, Hudson, N.Y. Miniature animals.

The Judy Company, 310 N. 2 St., Minneapolis 1, Minn. Instructional toys, models.

Models of Industry, 2804 Tenth St., Berkeley, Calif.

New York Scientific Supply Co., 28 W. 30 St., New York 1, N.Y. Models.

A. J. Nystrom & Co., 3333 Elston Ave., Chicago 18, Ill. Models.

Ward's Natural Science Establishment, 3000 East Ridge Road, Rochester, N.Y. Models.

Weber-Costello Co., 12th & McKinley, Chicago Heights, Ill. Models.

W. M. Welch Scientific Co., 1515 Sedgwick St., Chicago, Ill. Models.

FILMSTRIPS, SLIDES, TRANSPARENCIES[1]

American Council on Education, 1785 Massachusetts Ave. N.W., Washington, D.C.

Anti-Defamation League of B'nai B'rith, 212 Fifth Ave., New York, N.Y.

[1] Additional sources may be found in the following publications: *Catalogues of Short Films and Filmstrips—Selected List*, UNESCO, 19 Avenue Kleber, Paris 16ᵉ, France. *Educators Guide to Free Slidefilms*, Educators Progress Service, Randolph, Wis.; *Films and*

Audio-Visual Materials Bureau, Wayne University, Detroit 1, Mich.
Audio-Visual School Service, 20 East 35 Street, New York 16, N.Y.
Bailey Films, Inc., 6509 De Longpre Ave., Hollywood 28, Calif.
Stanley Bowmar Co., Inc., 12 Cleveland St., Valhalla, N.Y.
British Information Services, 30 Rockefeller Plaza, New York 20, N.Y.
Classroom Films, Inc., 321 E. 44 St., New York, N.Y.
Coronet Films, Coronet Bldg., Chicago, Ill.
Creative Arts Studio, Inc., 814 H St. N.W., Washington, D.C.
Current Affairs, Film Division, 18 E. 41 St., New York 17, N.Y.
Pat Dowling Pictures, 1056 S. Robertson Blvd., Los Angeles 35, Calif.
Educational Screen & Audio-Visual Cuide, 2000 Lincoln Park West Bldg., Chicago 14, Ill.
Encylopædia Britannica Films, Inc., 1150 Wilmette Ave., Wilmette, Ill.
Filmfax Productions, 10 E. 43 St., New York 17, N.Y.
Films, Inc., P.O. Box 358, Wilmette, Ill.
Filmstrip House, 15 W. 46 St., New York 36, N.Y.
Heritage Filmstrips, 89-11 63 Drive, Rego Park 74, N.Y.
Informative Classroom Picture Publishers, 31 Ottawa Ave. N.W., Grand Rapids, Mich.
Instructional Films, Inc., 330 W. 42 St., New York 18, N.Y.
International Film Bureau, Inc., 57 W. Jackson Blvd., Chicago, Ill.
Jam Handy Organization, 2821 E. Grand Blvd., Detroit, Mich.
Key Productions, Inc., Current Affairs Films Division, 527 Madison Ave., New York 22, N.Y.
Keystone View Co., Hamilton aod Crandall St., Meadville, Penna.
Knowledge Builders, 625 Madison Ave., New York 22, N.Y.
Life Magazine, Inc., Filmstrip Division, 9 Rockefeller Plaza, New York 20, N.Y.
Long Filmslide Service, 7505 Fairmount Ave., El Cerrito 8, Calif.
McGraw-Hill Book Co., Text-Film Dept., 330 W. 42 St., New York 36, N.Y.
Moody Institute of Science, Educational Film Division, 11428 Santa Monica Blvd., West Los Angeles 25, Calif.
National Audubon Society, Photo and Film Dept., 436 Fifth Ave., New York 38, N.Y.
National Film Board of Canada, 1270 Ave. of the Americas, New York 20, N.Y.
National Safety Council, 20 N. Wacker Drive, Chicago 6, Ill.

Filmstrips About Education, UNESCO, 19 Avenue Kleber, Paris 16ᵉ, France, *Filmstrip Guide*, H. W. Wilson Company, 050 University Ave., New York, N.Y.; *Sound Slidefilm Guide and Complete Source List*, Business Screen Magazine, Inc., 7064 Sheridan Road, Chicago, Ill.

New York Times, Office of Educational Activities, 229 W. 43 St., New York 18, N.Y.

New York Times, School Service Dept., 220 West 43 St., New York 18, N.Y.

Nu-Art Films, Inc., 112 W. 48 St., New York 19, N.Y.

Photo & Sound Company, 116 Natoma St., San Francisco, Calif.

Pictorial Events, 597 Fifth Ave., New York, N.Y.

Popular Science Pub. Co., Audio-Visual Division, 353 Fourth Ave., New York, N.Y.

Dr. Konrad Prothman, 7 Soper Ave., Baldwin, L.I., N.Y.

Radio-Mat Slide Co., Inc., 222 Oakridge Blvd., Daytona Beach, Fla.

Sawyer's, Inc., Progress, Oregon.

Silver Burdett Co., Park Ave., Morristown, N.J.

Society for Visual Education, Inc., 1345 W. Diversey Parkway, Chicago, Ill.

Southern Colorslides, 2326 Beecher Rd. S.W., Atlanta, Ga.

Stanley Bowmar Co., Inc., 12 Cleveland St., Valhalla, N.Y.

Stori-Views, 3312 Lindell Blvd., St. Louis 3, Mo.

Teaching Aids Exchange, 711 Sycamore Ave., Modesto, Calif.

Tweedy Transparencies, 321 Central Ave., Newark, N.Y.

United Nations, Films & Visual Information Div., New York, N.Y.

U.S. Office of Education, Dept. of Health, Education, and Welfare, Washington 25, D.C.

United World Films, Inc., 1445 Park Ave., New York 29, N.Y.

Visual Sciences, Suffern, N.Y.

Ward's Natural Science Establishment, Inc., 3000 East Ridge Road, Rochester, N.Y.

Yale University Press, Film Service, 386 Fourth Ave., New York 16, N.Y.

Young America Films, 18 E. 41 St. New York 17, N.Y.

Sensitized Plastic Sheets

Charles Beseler Co., 219 S. 18 St., East Orange, N.J.

Ozalid Co., Johnson City, N.Y.

Tecnifax Corp., 195 Appleton St., Holyoke, Mass.

MAPS AND GLOBES

Aero Service Corp., 210 Courtland, Philadelphia 20, Pa. Plastic relief maps.

American Map Co., 16 E. 42 St., New York, N.Y.

George F. Cram Co., 730 E. Washington St., Indianapolis, Ind.

Denoyer-Geppert, 5235 Ravenswood Ave., Chicago 40, Ill.

A. B. Dick Co., 720 W. Jackson Blvd., Chicago 6, Ill. Map stencils.

Farquhar Transparent Globes, 3727 Spruce St., Philadelphia 4, Pa.
Gunter Illustrated Maps, 246 Taraval St., San Francisco, Calif.
Hammett Co., 290 Main St., Cambridge 42, Mass.
C. S. Hammond & Co., 521 Fifth Ave., New York 17, N.Y. Maps.
McKinley Publishing Co., 1021 Filbert St., Philadelphia, Pa. Maps.
National Geographic Society, 16th and M Sts., Washington, D.C. Maps.
A. J. Nystrom & Co., 3333 Elston Ave., Chicago 18, Ill.
Rand McNally & Co., 536 S. Clark St., Chicago 5, Ill.
Replogle Globes, 315 N. Hoyne Ave., Chicago 12, Ill.
Weber-Costello Co., 12th & McKinley, Chicago Heights, Ill.

MOTION-PICTURE FILMS (16 MM.)[2]

Academy Films, 800 N. Seward St., Hollywood, Calif.
A. F. Films, Inc., 1600 Broadway, New York, N.Y.
Athena Films, 165 W. 46 St., New York, N.Y.
Bailey Films, Inc., 2044 N. Berendo, Hollywood, Calif.
Arthur Barr Productions, 1265 Bresee Ave., Pasadena, Calif.
Bell System Telephone Offices; consult local Bell System business office.
Brandon Films, Inc., 1700 Broadway, New York, N.Y.
Bray Studios, Inc., 729 Seventh Ave., New York, N.Y.
British Information Services, 39 S. La Salle St., Chicago, Ill.
Business Education Films, 104 W. 61 St., New York, N.Y.
Capital Film Productions, 224 Abbott Road, East Lansing, Mich.
Castle Films, Division of United World Films, Inc., 1445 Park Ave., New York, N.Y.
China Film Enterprises of America, Inc., 11 W. 42 St., New York, N.Y.
Churchill-Wexler Film Productions, 137 N. La Brea Ave., Los Angeles, Calif.
Columbia University, Film Library, 413 W. 117 St., New York, N.Y.
Coronet Films, 65 E. South Water St., Chicago, Ill.
Sid Davis Productions, 5608 Clemson St., Los Angeles, Calif.
Walt Disney Productions, 16mm. Film Division, 2400 W. Alameda Ave., Burbank, Calif.
Encyclopædia Britannica Films, 1150 Wilmette Ave., Wilmette, Ill.
Films Incorporated, 64 E. Lake St., Chicago, Ill.
Films of the Nations, Inc., 62 W. 45 St., New York, N.Y.

[2] Published sources of films: *Educational Film Guide* and supplements, H. W. Wilson Company, 950–972 University Ave., New York, N.Y.; *Educators Guide to Free Films*, Educators Progress Service, Randolph, Wis.; *Films and Filmstrips About Education*, UNESCO, 19 Avenue Kleber, Paris 16e, France.

Frith Films, 1816 N. Highland Ave., Hollywood, Calif.
Gateway Productions, Inc., 1859 Powell St., San Francisco, Calif.
Hawley-Lord, Inc., 61 W. 56 St., New York, N.Y.
Heidenkamp Nature Pictures, 538 Glen Arden Drive, Pittsburgh, Pa.
Paul Hoefler Productions, 7934 Santa Monica Blvd., Los Angeles, Calif.
Hoffberg Productions, Inc., 362 W. 44 St., New York, N.Y.
Indiana University, Audio-Visual Center, Bloomington, Ind.
International Film Bureau, Inc., 57 E. Jackson Blvd., Chicago, Ill.
International Film Foundation, Inc., 1600 Broadway, New York, N.Y.
Iowa State College, Visual Instruction Service, Ames, Iowa.
Jam Handy Organization, 2821 E. Grand Blvd., Detroit, Mich.; and 1775 Broadway, New York, N.Y.
Johnson-Hunt Productions, 6509 De Longpre Ave., Hollywood, Calif.
Knowledge Builders, 625 Madison Ave., New York, N.Y.
Library Films, 25 W. 45 St., New York, N.Y.
McGraw-Hill Book Company, Text-Film Department, 330 W. 42 St., New York, N.Y.
March of Time, 369 Lexington Ave., New York, N.Y.
Museum of Modern Art Film Library, Circulation Director, 11 W. 53 St., New York, N.Y.
National Film Board of Canada, 400 W. Madison St., Chicago, Ill.
New York Central System, Motion Picture Bureau, 466 Lexington Ave., New York, N.Y.
New York University Film Library, Distribution Dept., 26 Washington Place, New York, N.Y.
Nu-Art Films, Inc., 112 W. 48 St., New York, N.Y.
Office of Inter-American Affairs; films available through United World Films.
Office of War Information; films available through United World Films.
Official Films, Inc., 209 W. Jackson Blvd., Chicago, Ill.
Pan American Union, Organization of American States, Div. of Labor and Social Affairs, Washington, D.C.
Pan American World Airways System, 28–19 Bridge Plaza North, Long Island City, N.Y.
Pennsylvania State College, Audio-Visual Aids Library, State College, Pa.
Pictorial Films, Inc., 105 E. 106 St., New York, N.Y.
Portafilms, 418 North Glendale Ave., Glendale, Calif.
Post Pictures Corp., 115 W. 45 St., New York, N.Y.
Progressive Pictures, 6351 Thornhill Drive, Oakland, Calif.
RKO Radio Pictures, Inc., 1270 Ave. of the Americas, New York, N.Y.

Simmel-Meservey, Inc., 321 South Beverly Drive, Beverly Hills, Calif.
Sinclair Refining Co., 606 Wisconsin Ave., Milwaukee, Wis.
Society for Advancement of Management, 411 Fifth Ave., New York 16, N.Y.
Standard Oil Co., 910 S. Michigan Ave., Chicago, Ill.
Sterling Films, 316 W. 57 St., New York, N.Y.
Swedish Travel Information Bureau, Inc., 630 Fifth Ave., New York, N.Y.
Teaching Film Custodians, Inc., 25 W. 43 St., New York, N.Y.
Tennessee Valley Authority, Information Service Staff, Knoxville, Tenn.
Warwick M. Tompkins Films, 1046 W. Edgeware Road, Los Angeles, Calif.
Trans-World Films, Inc., 2209 E. 75 St., Chicago 49, Ill.
United Nations, Department of Public Information, Film & Visual Information Div., Room 6306 C, Empire State Bldg., 350 Fifth Ave., New York, N.Y.
U.S. Bureau of Reclamation Library, Washington, D.C.
U.S. Department of Agriculture, Motion Picture Service, Office of Information, Washington, D.C.
U.S. Department of the Air Force, Directorate of Public Relations, Pictorial Branch, Washington, D.C.
U.S. Department of Commerce, Weather Bureau, Washington, D.C.
U.S. Department of the Interior, Bureau of Mines, Central Experiment Station, 4800 Forbes St., Pittsburgh, Pa.
U.S. Dept. of the Interior, Fish & Wildlife Service, Washington, D.C.
U.S. Department of Justice, Federal Bureau of Investigation, Washington, D.C.
U.S. Forest Service, Washington, D.C.
U.S. Treasury Department, Washington, D.C.
United World Films, 1445 Park Ave., New York, N.Y.
University of California, Dept. of Visual Instruction, Univ. Extension, 2272 Union St., Berkeley, Calif.
University of Iowa, Extension Division, Iowa City, Iowa.
University of Minnesota, Audio-Visual Extension Service, 230 Northrop Auditorium, Minneapolis, Minn.
University of Southern California, Audio-Visual Service Dept., Los Angeles, Calif.
University of Virginia, Bur. of Teaching Materials, Extension Div., Box 1487, University Station, Charlottesville, Va.
University of Wisconsin, Bureau of Audio-Visual Instruction, Univ. Extension, 1312 W. Johnson St., Madison 6, Wis.
Virginia State Board of Education, Film Production Service, Richmond, Va.
Vocational Guidance Films, Inc., Carl F. Mahnke Productions, 215 E. 3 St., Des Moines, Iowa.

Wistar Institute of Anatomy and Biology, Woodland Avenue and 36 St., Philadelphia, Pa.
Young America Films, Inc., 18 E. 41 St., New York, N.Y.

PICTURES AND GRAPHICS

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Central Scientific Co., 1700 Irving Park Road, Chicago, Ill.
Clay-Adams Co., Inc., 141 E. 25 St., New York 10, N.Y.
Denoyer-Geppert Co., 5235 Ravenswood Ave., Chicago 40, Ill.
General Biological Supply House, Inc., 8200 South Hayne Ave., Chicago 20, Ill.
A. J. Nystrom & Co., 3333 Elston Ave., Chicago, Ill.
Rudolf Schick Publishing Co., 700 Riverside Drive, New York, 31, N.Y.
Ward's Natural Science Establishment, Inc., 3000 East Ridge Road, Rochester, N.Y.
Weber Costello Co., Chicago Heights, Ill.

Flat Pictures

Artext Prints, Inc., Westport, Conn.
British Information Services, 30 Rockefeller Plaza, New York 20, N.Y.
Marguerite Brown, Study Prints, Compton, Calif.
Colonial Art Co., 1336-8 N.W. First St., Oklahoma City 4, Okla.
Creative Education Society, Mankato, Minn.
Friendship Press, 156 Fifth Ave., New York 10, N.Y.
Informative Classroom Pictures, 31 Ottawa Ave. N.W., Grand Rapids, Mich.
Instructor Magazine, Normal Park, Dansville, N.Y.
Latin American Village Studio, 3530 State St., Santa Barbara, Calif.
National Geographic Magazine, 16th and M Sts., Washington, D.C.
Perry Pictures Co., Malden, Mass.
Picto-Chrome Publishing Co., 1428 U St. N.W., Washington, D.C.
Realistic Visual Aids, Highland, Calif.

Instructional Comics, Classics Illustrated

Gilbertson Co., 826 Broadway, New York, N.Y.

Instructional Comics, Science

Educational Comics, Inc., 225 Lafayette St., New York, N.Y.
General Electric Co., Educational Service Division, Dept. 6-235A, Schenectady, N.Y.
Swift and Co., Educational Services, Union Stock Yards, Chicago, Ill.

Posters

American Dental Association, 222 E. Superior St., Chicago, Ill.
American Humane Education Society, 180 Longwood Ave., Boston, Mass.
Atchison, Topeka, and Santa Fe Railway System, 80 E. Jackson Blvd., Chicago, Ill.
Canadian Information Service, 400 W. Madison St., Chicago, Ill.
Cunard Line, 25 Broadway, New York, N.Y.
French Line, Educational Department, 610 Fifth Ave, New York, N.Y.
General Mills, Education Section, Dept. of Public Services, Minneapolis, Minn.
Hamburg American Line, c/o U.S. Navigation Company, General Agents, 17 Battery Place, New York, N.Y.
National Safety Council, 425 N. Michigan Ave., Chicago, Ill.
Pan American World Airways, 28-19 Bridge Plaza North, Long Island City, N.Y.
Westinghouse Electric Corp., School Service Dept, 306 Fourth Ave., Pittsburgh, Pa.
Wild Flower Preservation Society, Inc, 3740 Oliver St. N.W., Washington, D.C.

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Argus Cameras, Inc., Sales Service Div., 405 Fourth St., Ann Arbor, Mich.
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Automatic Projection Corp., 282 Seventh Ave., New York 1, N.Y.
Bausch & Lomb Optical Co., 626 St. Paul St., Rochester 2, N.Y.
Bell & Howell Co., 7100 McCormick Road, Chicago 45, Ill.
Charles Beseler Co., 219 S. 18 St., East Orange, N.J.
Brumberger Sales Corp., 34-34th St., Brooklyn 32, N.Y.
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Eastman Kodak Co., 343 State St., Rochester 4, N.Y.
Genarco, Inc., 97-04 Sutphin Blvd., Jamaica 35, N.Y.
C-M Laboratories, Inc., 4300 N. Knox Ave., Chicago 41, Ill.
Gold-E Manufacturing Co., 4888 No. Clark St., Chicago 40, Ill.
Karl Heitz, Inc., 480 Lexington Ave., New York 17, N.Y.
Keystone View Co., Hamilton & Crandall St., Meadville, Pa.

La Belle Industries, Inc., Oconomowoc, Wis.
E. Leitz, Inc., 468 Fourth Ave., New York 16, N.Y.
Naren Industry, Inc., 2104-06 N. Orchard St., Chicago 14, Ill.
Picture Recording Co., 1395 W. Wisconsin Ave., Oconomowoc, Wis.
Revere Camera Co., 320 E. 21 St., Chicago 16, Ill.
Society for Visual Education, Inc., 1345 W. Diversey Parkway, Chicago, Ill.
Spindler & Sauppe, 2201 Beverly Blvd., Los Angeles, Calif.
Standard Projector & Equipment Co., 7106 W. Touhy Ave., Chicago 31, Ill.
Strong Electric Corp., 87 City Park Ave., Toledo 2, Ohio.
Three Dimension Co., Division of Bell & Howell, 3512 N. Kostner Ave., Chicago, Ill.
Viewlex, 3501 Queens Blvd., Long Island City 1, N.Y.

Microprojectors

American Optical Co., Instrument Div., 155 E. 44 St., New York 17, N.Y.
Bausch & Lomb Optical Co., 626 St. Paul St., Rochester 2, N.Y.
Karl Heitz, Inc., 480 Lexington Ave., New York 17, N.Y.
Rayoscope Co., 358 N. Sandusky, Delaware, Ohio.
Society for Visual Education, Inc., 1345 W. Diversey Parkway, Chicago 14, Ill.
Universal Scoscope Co., 1632 N.W. 5 Street, Oklahoma 6, Okla.
Victor Animatograph Corp., Davenport, Iowa.

Opaque Projectors

American Optical Co., 80 Heard St., Chelsea, Mass.
Bausch & Lomb Optical Co., 626 St. Paul St., Rochester 2, N.Y.
Charles Beseler Co., 219 S. 18 St., East Orange, N.J.
Karl Heitz, Inc., 480 Lexington Ave., New York 17, N.Y.
Keystone View Co., Hamilton & Crandall St., Meadville, Pa.
Lacey-Luci Products Co., 31 Central Ave., Newark 2, N.J.
Rollab Photo Science Labs., Sandy Hook, Conn.
Squibb Taylor, Inc., 1213 South Akard St., Dallas, Texas.

Overhead Transparency Projectors

American Optical Co., 80 Heard St., Chelsea, Mass.
Charles Beseler Co., 219 S. 18 St., East Orange, N.J.
Screen Scriber, Visual Training Aids, 180 W. Randolph St., Chicago, Ill.
Victorlite Industry, Inc., 4117 W. Jefferson Blvd., Los Angeles, Calif.

Sound Filmstrip Projectors

Audio-Master Corp., 17 E. 45 St., New York 17, N.Y.
Automatic Projection Corp., 252 Seventh Ave., New York 1, N.Y.

DuKane Corp., 100 N. 11 St., St. Charles, Ill.
Electronic Teaching Laboratories, 1818 M St. N.W., Washington 6, D.C.
Hollywood Sound & Lighting Co., Otto K. Olesen Co., 1534 Cahuenga Blvd., Hollywood, Calif.
Illustravox Division, Electro Engineering & Mfg. Co., 627 W. Alexandrine St., Detroit 1, Mich.
La Belle Industries, Inc., Oconomowoc, Wis.
O. J. McClure Talking Pictures, 1118 W. Washington Blvd., Chicago, Ill.
Society for Visual Education, Inc., 1345 W. Diversey Parkway, Chicago, Ill.
Viewlex, 3501 Queens Blvd., Long Island City 1, N.Y.

Sound Motion-Picture Projectors (16 mm.)

Ampro Corp., 2835 N. Western Ave., Chicago 18, Ill.
Bell & Howell Co., 7100 McCormick Road, Chicago 45, Ill.
DeVry Corp., see Bell and Howell Co.
Eastman Kodak Co., 343 State St., Rochester 4, N.Y.
Fourway Industry, Inc., 122 Green Ave., Woodbury, N.J.
Holmes Projector Co., 1815 N. Orchard St., Chicago, Ill.
Paillard Products, Inc., 100 Ave. of the Americas, New York 13, N.Y.
Radio Corp. of America, Audio-Visual Products, Bldg. 15-5, Camden, N.J.
Revere Camera Co., 320 E. 21 St., Chicago 16, Ill.
Technical Service, Inc., 30865 W. 5 Mile Road, Livonia, Mich.
Victor Animatograph Corp., Davenport, Iowa.

Sound Motion-Picture Projectors (16 mm. Special Magnetic Sound Type)

Ampro Corp., 2835 N. Western Ave., Chicago 18, Ill.
Bell and Howell Co., 7100 McCormick Road, Chicago 45, Ill.
Radio Corp. of America, Audio-Visual Products, Bldg. 15-5, Camden, N.J.
Victor Animatograph Corp., Davenport, Iowa.

Three-Dimensional Slide Projectors

Compco Corp., 2251 W. St. Paul Ave., Chicago 47, Ill.
Sawyer's Inc., Box 490, Portland 7, Oregon.
Spindler & Sauppe, 2201 Beverly Blvd., Los Angeles, Calif.
Three Dimension Co., Division of Bell & Howell, 3512 N. Kostner Ave., Chicago 45, Ill.

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American Optical Co., 80 Heard St., Chelsea, Mass.
Bausch & Lomb Optical Co., 626 St. Paul St., Rochester 2, N.Y.
Charles Beseler Co., 219 S. 18 St., East Orange, N.J.
Keystone View Co., Hamilton & Crandall St., Meadville, Pa.

RADIO RECEIVERS, AM-FM

Arvin Industries, Inc., Nobbitt St., Columbus, Ind. Model 780 TFM.

Fairchild (Freed Eisemann), Robins Lane, Syosset, Long Island, N.Y. Educator Model.

Granco, 36-17 20th Ave., Long Island City, N.Y. Models 730, 740.

Magnavox, Bldg. 15, Fort Wayne, Ind. Model FM-16.

Montgomery-Ward, local stores. Model 62B-1572R.

Philco, 445 East Tioga St., Philadelphia, Pa. Model 956.

RCA-Victor, 30 Rockefeller Plaza, New York, N.Y. Model 6XF9.

Sears Roebuck, local stores. Model 4204.

Zenith, 601 West Dickens, Chicago, Ill. Model T-724.

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Audio-Master Corp., 17 E. 45 St., New York 17, N.Y.

David Bogen, Inc., 29 Ninth Ave., New York 14, N.Y.

Califono Corp., 1041 N. Sycamore, Hollywood 38, Calif.

DuKano Corp., 100 N. 11, St. Charles, Ill.

Mitchell Manufacturing Co., 2525 Clybourn Ave., Chicago 14, Ill.

Newcomb Electronics Corp., 6824 Lexington Ave., Hollywood, Calif.

Steelman Phonograph & Radio Co., 12-30 Anderson Ave., Mt. Vernon, N.Y.

U.S. Recording Co., 1121 Vermont Ave. N.W., Washington 5, D.C.

Webster-Chicago Corp., 5610 Bloomingdale Ave., Chicago 39, Ill.

RECORDINGS AND TRANSCRIPTIONS

American Library Association, 50 E. Huron St., Chicago, Ill.
Folk Tale Records: humorous, fanciful folk stories, like Paul Bunyan and Pecos Bill, by master storytellers. 78 r.p.m., 12"; set of 5—$14; single—$3.
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Crescent Industries, Inc., 5900 West Touhy Ave., Chicago 31, Ill.
Daystream Electric Corp., Crestwood Recorder Division, 221 La Salle St., Chicago 1, Ill.
Federal Mfg. & Engr. Corp., 213 Steuben St., Brooklyn 5, N.Y.
Magnecord, Inc., 225 W. Ohio St., Chicago 10, Ill.
Pentron Corp., 777 S. Tripp Ave., Chicago 24, Ill.
Radio Corp. of America, Cherry Hill, Camden 8, N.J.
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Tape Recorders, Inc., 1501 W. Congress St., Chicago 7, Ill.
Webster-Chicago Corp., 5610 Bloomingdale Ave., Chicago 39, Ill.
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Wilcox Gay Corp., 585 Fourth Ave., New York 10, N.Y.

Tape Recording Services and Libraries

The following institutions maintain libraries or service centers. Catalogues of tape-recorded programs suitable for most curriculum areas are available on request. Most of these institutions will, for a small fee, transcribe selected programs on to tapes supplied by schools; these tapes may be kept permanently by the schools.

Brigham Young University, Bureau of Audio-Visual Instruction, Provo, Utah.
British Information Services, Radio and Television Section, New York, N.Y.
Division of Audio-Visual Aids, State Department of Education, Rhode Island College of Education, Park and Hayes Sts., Providence, Rhode Island.
Division of Supervised Study, State College Station, Fargo, N.D.
Eastern Montana College of Education, Eastern Tape Recording Center, Billings, Mont.
National Education Association, Department of Audio-Visual Instruction, 1201 Sixteenth St. N.W., Washington 6, D.C.
Oklahoma A & M College, Audio-Visual Center, Stillwater, Okla.
State Department of Education, 32 State Office Bldg., St. Paul 1, Minn.
University of Connecticut, Audio-Visual Center, Storrs, Connecticut.
University of Illinois, Visual Aids Service, Champaign, Ill.
University of Iowa, Bureau of Audio-Visual Instruction, Iowa City, Iowa.
University of Michigan, Audio-Visual Educatioo Center, Ann Arbor, Mich.
University of Nebraska, Bureau of Audio-Visual Instruction, Lincoln, Neb.
University of New Hampshire, Audio-Visual Center, Durham, N.H
University of Oklahoma, Educational Materials Services, Norman, Okla.

A-V Tape Libraries, 730 Fifth Ave., New York 19, N.Y.
Symphonies on 4800-foot large-reel tape. Classical and popular music. Catalogue on request.

Educators Progress Service, Randolph, Wis.
"Educators Guide to Free Tapes, Scripts and Transcriptions"—includes free tapes suitable for classroom use in health and safety, conservation, music, language arts, science, social studies including citizenship, geography, history, and social problems. Catalogue can be purchased. Inquiries welcome.

EMC Recordings Corp., 806 E. 7 St., St. Paul 6, Minn.
Recordings on tape, both 3.75 ips and 7.5 ips, in business education, foreign languages including French, Latin, German, and Spanish, elementary music, college music, etc. Catalogue on request.

International Communications Association, 317 Citizens Bldg., Cleveland, Ohio.
3.75 ips and 7.5 ips tapes of music of foreign countries. Catalogue on request.

Phonotapes Inc., 853 Ninth Ave., New York 17, N.Y.
7.5 ips and 3.75 ips tapes of literature, language, music. Catalogue on request.

Shakespeare Tape Library, 1818 M St. N.W., Washington, D.C.
3.75 and 7.5 ips. French and Spanish literature and verse, Italian and French operatic recordings. Catalogue on request.

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